# COMPUTERWORLD

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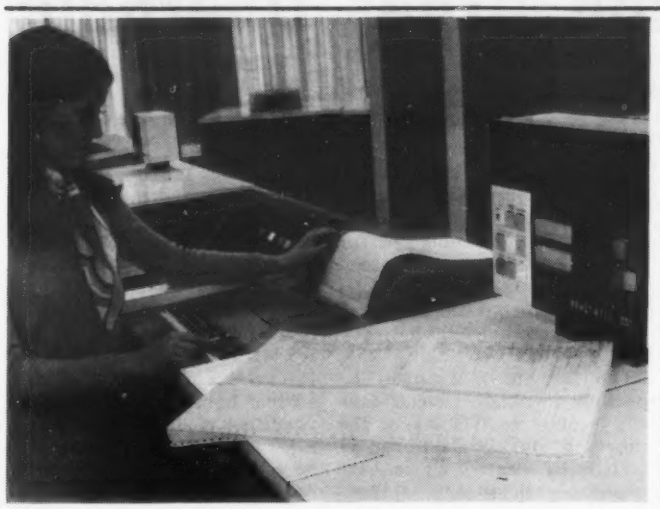

HIS computer operator enters data into the console keyboard of the new Honeywell 2015 system.

## Medium-Scale CPUs Add to HIS 200 Line

By Frank Piasta
CW Staff Writer

WELLESLEY HILLS, Mass.– Honeywell Information Systems Inc. (HIS) has made the first major announcement of 1971 with the addition of two medium-scale processors, the 1015 and the 2015, to its Series 200 computers.

Continuing the trend established last year by most manufacturers, the new models are largely evolutionary in nature, designed to offer the user improved price/performance ratios, rather than technological pioneering.

The new CPUs fit into the middle of the line of the existing Series 200 systems. The 1015 extends the size range offered by the Model 200 at comparable cost while offering performance levels approaching those of the Model 1250 processors.

The other entry, the Model 2015, overlaps the larger current Model 2200 in size, while offering significant improvements in performance, I/O capabilities, and cost. In its larger configurations, it more closely resembles a somewhat slowed down 3200, at a better price.

### OS/200 Available

Both models let the user take advantage of the HIS OS/200 Operating System which until now was limited to 1200 users at its low end.

Minimum configuration for the operating system matches those required for the processors, consisting of a console, disk drive and interval timer.

The HIS models seem to be an attempt by the company to attract current users of IBM 360 models 25, 30, and 40 to the 200 fold before IBM unveils the expected 370/135.

Other users at whom the HIS machines seem to be aimed include those with Burroughs B2500 and B3500, NCR Century 200s, and those who might

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## Disk Independents Drop Prices for IBM 360 Users

By Frank Piasta
CW Staff Writer

Independent disk suppliers last week told users they were ready to improve on IBM's low 2319 disk configuration prices.

Users of 2314-compatible disk drives from independents could save up to 10% compared to IBM's recently announced 2319 disk system, but the actual price cuts in one case range up to 20% from previous independent pricing.

The price changes were announced in response to IBM's pre-Christmas disk modifications [CW, Dec. 23] which effectively expanded the use of 2319s to most 360 users and left independent peripherals users at a potential price disadvantage.

Potter Instrument Co., Telex Computer Products, and California Computer Products (Calcomp) all announced price changes. Potter dropped the price of its eight-drive 2314-compatible system, including controller, from $4,620 to $4,370. Telex will price its controller at $1,340, plus $305 for each drive, with a nine-drive system costing $4,085 from the previous $5,220.

The effective date for the price changes will be April 1 for Potter, May 1 for Telex. The companies said that all current users of leased equipment will benefit from the decreased prices.

Calcomp declined to reveal specific prices, but told CW that its new prices would be about 10% below those of IBM, which is about $4,032.

A Calcomp spokesman told CW that even after the IBM announcement most one-year lease users still remained 1% to 2% below IBM's adjusted prices, although "for certain configurations," some Calcomp users were paying 5% more than IBM.

He said that all new one-year lease users would immediately get a 10% price advantage. Existing one-year lease customers could be affected with lower rates but they should check with their salesman, he suggested.

An Ampex spokeman said that his firm will meet the newly announced Telex price cuts.

The price of the IBM system is $4,480 for nine drives plus a controller.

Most other manufacturers have not yet responded with new prices, but it seems certain that the user can expect to continue reducing his rental costs with independent equipment.

The price differential with IBM will probably not be as great as it has been in the past, which amounted to as much as 20%.

Marshall Industries, for example, will offer reductions in leasing rates, according to a spokesman. The company will price its units "competitively" with IBM systems, he said.

Memorex said that it hasn't

*(Continued on Page 2)*

### Lawyer's Warning

## Let Customer Beware In Computer Contract

By Edward J. Bride
CW Staff Writer

*. . . no responsibility for any injury or damages, caused by [the company's] negligence.*

*. . . no responsibility for loss or security of programs, data and other information so submitted. [the company] does not guarantee the correctness of any programs, data or other information furnished by it.*

These excerpts from a typical computer service contract point dramatically to the need for customers of such companies to know what their obligations will be.

These customers should become fully aware of the limitations their vendors' personnel and equipment, because of the increasing efforts of these companies to "avoid legal responsibilities," warned a Boston lawyer who has specialized in computer contracts.

Efforts to shun legal responsibility for data processing errors are not necessarily unjustified, said Roy N. Freed, who has been called a "one-man committee" for the strengthening of the legal rights of computer users.

A supplier might insist that he be absolved even for losses due to his own negligence, Freed told CW, "not because he expects to be careless," but rather as a means for staving off claims and lawsuits that are "inevitably expensive" if they result.

Insurance against lawsuits arising from such errors is now available to the suppliers of the services, but it is quite expensive, Freed noted, and the cost is generally passed on to the user.

The caveat emptor rule extends to the customers of data processing service companies because, if the work were done in-house, the customer would experience the same type of personnel and/or equipment errors as the supplier, he claimed.

### Is Protection Enforced?

The president of a service company in Kentucky recently told CW that, even with clauses which protect the company, he would be reluctant to enforce the contract completely, because the company would undoubtedly lose customers in the process.

Another national service con-

*(Continued on Page 2)*

### Conflicting Addresses Cited

## Machine Says No, Police Don't Go

By Joseph Hanlon
CW Staff Writer

NEW YORK – The New York Police Department refused to send out a policeman in response to a 911 emergency call because the caller's address wasn't listed in its computer, according to a charge made by the *Sunday News*.

The police deny the substance of the *News* charge, but they do admit that in a computer designed to deal with emergencies, they sometimes use different addresses than the ones used by the residents themselves, possibly slowing response time somewhat by forcing a dispatcher to make the correction.

New York City has a $1.2 million computerized Police Communications Center designed to speed policemen to the scene of a crime or emergency. If a person calls the emergency number, 911, the clerk answering the telephone immediately enters the information into an IBM 2915 CRT terminal.

A 360/40 routes the data to the proper dispatcher, tells the dispatcher the sector of the city, the nearest cross streets, and the three closest police cars. The dispatcher then assigns the car.

The difficulty with the addresses occurs in Queens, where addresses are hyphenated, with the first part identifying a cross street. Thus, 72-152 Burns St. means Burns Street near 72nd Road. In Forest Hills Gardens, a private development in Queens, the first two numbers are not used by the residents, even though they are used on official city maps.

The post office uses the number that the residents themselves use (152 Burns St. is listed in the Zip Code directory, for example), but the police use only official city numbers.

### No Big Problem

According to Deputy Inspector Anthony Bouza, this should not present too much of a problem. If the computer reports that an incorrect address has been input, the clerk can push an override button. The information is then sent directly to the dispatcher without computer intervention,

*(Continued on Page 2)*

# 6 States Ask IRS to Correct Faulty Tax Tapes

By Edward J. Bride
CW Staff Writer

MARTINSBURG, W. Va. – Six states which received erroneous tax tapes from the Internal Revenue Service have returned the tapes to the IRS National Computer Center here for correction. The tapes are used in auditing state tax returns, comparing these returns with the federal tax reports.

Thirty-two states take part in the tape exchange program, but only six asked for corrections to errors which caused investment income to vary by as much as 10,000%.

The error was discovered by officials in Rhode Island in December. They were trying to determine why one taxpayer had taxable income of $130,000, paid close to $70,000 in taxes, but had investment income of only $10 in interest and $23 in dividends.

John Cicilline, head of the state's division of methods, data processing and control, said the IRS rounded off the investment income to the next lowest dollar by patching the program to drop the last two digits, then repeated the procedure by patching the program a second time.

A spokesman for Internal Revenue confirmed this, saying he guessed the altered program was set aside for higher priority work, and that personnel at the national center repatched the program when the work was actually started.

Federal records here were not changed, just those for states involved in the tape exchange program. These states normally compare by dollar and aren't too concerned with pennies, the IRS official noted.

Totals on the corrected tapes included pennies.

Of the states involved, Arizona, Alaska, Delaware, New Hampshire, and West Virginia also requested correction.

Cicilline stated after IRS was notified of the problem, it was only about five days before the tapes were returned to Rhode Island with the corrected amounts.

States pay the Federal Government for the exchange but the tax official stated the IRS would absorb the cost of the error: $1,939, which includes shipping costs and computer time.

# Investigation Urges Overhaul Of DP Department Programs

By Phyllis Huggins
CW West Coast Bureau

SAN FRANCISCO – The San Francisco DP Department has come under scrutiny as the grand jury made its annual investigation of the controller's office which includes the DP department.

Dissatisfaction and concern were expressed on several levels, but Henry Nanjo, head of the DP department, told CW that he thinks his department needs a high-powered public relations man to clear up the problem.

The grand jury report recommended that a sum of money be budgeted in the coming year for a qualified team to "overhaul and investigate the various department programs as they are" and to "recommend what they should be."

The jury feels it might be possible to obtain faster results and economies if some of the programs could be developed by private DP centers which have experience in specific applications on needs of city departments.

"Most people," Nanjo rebutted, "think all we do is process election votes and get out the payrolls." He pointed out that his staff has eight computers, including two 360/50s and one 65 and two PDP-12s.

**New Equipment Feasible?**

The jury also expressed concern that the department is 30 below the manpower for which it is budgeted. The report did not approve of the department ordering new equipment. If present machinery cannot produce the end result of greater output, the jury asked, "Is it feasible to order new equipment?"

The report cited the 1969-70 budget for the department as $1.9 million and this year's budget as $2.4 million. San Francisco is on a June to July fiscal year.

Nanjo expressed surprise at the report's budget figures, saying they are actually $4.5 million for last year and $5.6 million for this year.

While he felt this sizeable expenditure made the department a natural target for investigation, he said the figure is less than 1% of the city's budget and a lower percentage than that of neighboring counties.

Nanjo attributed the shortage of manpower in the department to programmer and senior programmer ratings below other cities or counties.

The inequities of pay scales, according to the jury, were exemplified in that San Francisco starts a programmer at $795/mo; Alameda County at $862, Los Angeles at $914.

The grand jury report also noted that there was no harmony between many of the department heads and the DP department.

In San Francisco the grand jury is charged to make an "investigation" of the controller's department yearly.

# Contracting Requires Sophisticated Customer

*(Continued from Page 1)*

cern said many companies have a limitation or "waiver of liability for erroneous computer runs, and that the company is normally required to "rerun a bad run," nothing more.

The effect of all these uncertainties can only be abated by a customer who is "sufficiently sophisticated to appreciate the transaction" being entered into, Freed surmised. "Otherwise, he probably doesn't deserve to be in business," he noted.

**Regarding Programs**

"It is a rare program that can be debugged completely." Freed continued.

There is therefore no substitute for knowing the capabilities of the programmers, as well as those of the operators and equipment. Suppliers of all associated services can include a "disavowal of liability" in any basic contract, Freed concluded.

He also suggested the contract illustrated above, exempting a Massachusetts service company from legal responsibility "for any injury or damages, caused by [the company's] negligence," was not necessarily unreasonable depending on the costs involved.

As long as the customer is willing to sign such a contract, and is able to look elsewhere, then the "disavowal" clause is proper.

Admittedly, there are some geographic areas where only one supplier is available, and in those cases, the additional cost for insurance protection might be justified.

The customer must pay, one way or another, for the losses resulting from errors that are "relatively inevitable," or for their avoidance, Freed postulated.

He added that in many situations a customer goes into the transaction with fair warning, and has "no grounds to complain."

## Consumers Do Care

ALEXANDRIA, Va.–Know of any gummed-up computers? Could be that small, orange stamps are appearing pasted over holes in punched card bills. They are available from the Virginia Citizens Consumer Council and irate consumers are expected to find many uses for them in attempts to notify merchants that they care.

The stamps may be purchased in books of 100 for $1 from the council at Box 3103.

# Computer Says No, So Police Don't Go

*(Continued from Page 1)*

and the dispatcher can try to figure out the difficulty. In this case, the Queens dispatcher would probably know about Forest Hills Gardens addresses, and be able to assign a police car.

Both Bouza and the *News* agree on what happened first. A woman, in great distress, called the police to report a man pounding on her door and demanding to see her daughter. She asked that a policeman be sent to her home at 152 Burns St., Forest Hills Gardens. When the police clerk entered the address into the computer, it responded that there was no such address, and the clerk asked for more information.

Here the stories differ. Bouza says that since no crime was being committed, the clerk did not want to authorize sending a policeman without more information, both on the actual event, and on the location of the house. Instead of giving the information, the woman hung up.

According to Tom McMorrow in the Dec. 27 *News*, the clerk told the woman he could not send a policeman because no such address existed. The woman, by this time quite upset, called a neighbor, who in turn called the police.

According to the *News*, the neighbor got the same response –no policeman because the address doesn't exist. The neighbor offered to meet a policeman on the corner of Ascan and Burns, and take him to the house.

According to the *News*, the clerk then reported that the computer said: "Ascan Avenue and Burns Street don't meet. They don't make a corner." The woman responded: "Well I don't know who made it, but it's outside my window and I'm looking at it. There's a traffic light and everything. Couldn't you try to find it?" The answer, according to the *News*, was no.

Bouza agrees that Ascan and Burns do meet, but declined to comment on whether the intersection is listed in the computer.

According to the police department, the whole matter is still under investigation. But one thing is clear: the whole mixup would have been less serious if the addresses in the data base agreed with the addresses that people actually used.

# Independent Suppliers Cut Prices Of 2314-Compatible Disk Drives

*(Continued from Page 1)*

had sufficient time to reach a firm decision, but the company can be expected to remain competitive.

Peripherals General indicated that although new prices have not been determined, they will probably be about 10% below those of IBM.

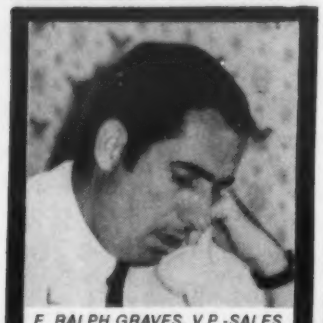
Bryant Computer Products said it will take necessary action to meet the competition. The amount of a price cut has not been decided, but one can be expected.

Potter also announced an across-the-board cut in all of its IBM compatible equipment.

The AT2427 tape drive, compatible with the IBM 2420-7, has been reduced to $600/mo from $885/mo. This was in response to IBM's announcement of its 3420-7 drive at $670/mo.

Other tape equipment reductions include the AT2405 from $475 to 400/mo, and the SC 2402 from $400 to $350/mo. Potter also reduced its TC5803-2 tape control unit from $680 to $550/mo.

Telex last month announced a tape drive and controller system [CW, Dec. 30] priced at about 11.6% below the IBM 3803/3420 system.

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MEMOREX

# HIS CPUs Stress Performance

*(Continued from Page 1)*

have been considering RCA's models 2 and 3.

The Model 1015 offers a performance advantage over the IBM 360/25 with a cycle time of 1.6 μsec/char as opposed to an effective time of 1.8 μsec/byte on the 25. (The 360/25 requires two 900 nsec cycles to fetch one or two bytes.) The cycle time of the 360/30 is slightly faster at 1.5 μsec/byte. In memory sizes, the 1015 offers machines with a range from 64K to 128K characters.

Up to 12 I/O channels are available to the 1015 user, eight of which can be operated simultaneously, for a throughput rate of 667K char/sec. The maximum of two selector channels on the 360/30, plus the multiplexer channel, can provide 531K byte/sec.

From a price point of view, the 1015 is competitive with both the 360/25 and 360/30 because of a processor price range that extends from $4,215 to $6,279 for capacities of 64K to 128K characters.

The larger 2015 is considerably faster than the 360/40 that Honeywell hopes it will replace, with a cycle time of 1.3 μsec/2 chars, compared to 2.5 μsec/2 bytes.

The user of the 2015 will have to pay a premium, though, if he upgraded from a 360/40. The cost of the 128K 360/40 is $6,390/mo while the one-year lease on the 2015 costs $7,325.

Both new models of the 200 series can use almost all of the peripherals currently offered. The only exceptions, according to Honeywell, are such devices as drums and fixed-head disks whose transfer rates exceed the capacities of the processors.

The Model 1015 is available on a three-month delivery schedule, while the 2015, HIS said, can be shipped immediately.

| Features / Models | CPU Rental $ (in thousands) | Cycle Time (μsec) | Char/ Cycle | Memory Sizes (K) | I/O Channels (max) |
|---|---|---|---|---|---|
| HIS 1015 | 4.2–6.3 | 1.6 | 1† | 64–128 char | 12 |
| HIS 2015 | 6.9–10.2 | 1.3 | 2† | 96–256 char | 12 |
| IBM 360/25 | 1.4–2.3 | 1.8 | 1* | 16–48 byte | 2 |
| IBM 360/30 | 1–3.8 | 1.5 | 1* | 8–64 byte | 3 |
| IBM 360/40 | 2.7–10.2 | 1.25 | 1* | 16–262 byte | 3 |
| HIS 1250 | 3.9–9.7 | 1.5 | 1† | 32–262 char | 8 |
| HIS 2200 | 3.8–12.3 | 1 | 1† | 16-262 char | 8 |
| HIS 3200 | 10.4–22.1 | 1 | 2† | 131–524 char | 19 |
| Burroughs B2500 | 1.6–5.6 | 2 | 2+ | 10–120 byte | 8 |
| Burroughs B3500 | 2.3–17.5 | 1 | 2+ | 10–500 byte | 20 |
| NCR 200 | 4–19 | .8 | 2* | 32–512 char | 8 |
| RCA 2 | 4.2–7.8 | 1.44 | 2* | 64–256 byte | 13 |

**Legend:** † character = 6-bit BCD character
+ character = 8-bit byte, 2/16-bit word
* character = 8-bit byte

**Chart compares processor characteristics of new HIS 1015 and 2015 systems with those of other representative systems.**

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# Model 115/2 Processor Has Larger Memories

By Frank Piasta
CW Staff Writer

WELLESLEY HILLS, Mass. – Along with the introduction of its new 1015 and 2015 processors, HIS added a new version of the Model 115, called the 115/2.

In addition, new tape and disk units were announced for the Series 200 along with an upper/lower case printer option and an IBM-compatible EBCDIC code translator.

Hardware multiply/divide, advanced programming/editing and 8-bit code handling are listed as standard equipment on the new model.

Prices for the 115/2 processor, on a one-year lease, range from $2,127 for the 32K model to $3,325 for the 65K model. The 115/2 will be available this month, but HIS said 115 processors cannot be upgraded to 115/2 specifications in the field.

### Tape Unit

HIS introduced the 205B-21/-22 tape unit to be used with 110, 115, 120, and 125 processors.

Compared to the older 204B-1/-2, the new unit offers 67% higher transfer rate, forward speed, and rewind speed, and shorter cross-gap time, HIS said.

The 205B is priced at $762/mo, including the 103F control, and $325/mo for additional drives. Model 120/125 users with 204B-11/-12/-15/-16 units can upgrade to the new 205B specs in the field, HIS said.

### Disk Pack Drive

The new 171 Disk Pack Drive is a single-spindle, 10-surface disk unit with an average seek time of 80 msec and a capacity of 4.6 million characters.

It is intended for use on Models 110, 115, 120, 125, and 200. The drive is priced at $321/mo and will be available during the first quarter of this year.

### Printer

A non-standard option to the Series 200 is the Type 239 Upper/Lower Case Printer, with a capacity of 670 line/min. The unit can be attached to Model 115 and larger processors and uses an 86-character set and has 132 print positions.

The 239 is available on a three-year lease at $1,975/mo and will be available during the second quarter of this year.

### Code Translator

An optional EBCDIC code translator for the 203D Tape Control is meant to convert a subset of IBM 8-level EBCDIC code to Honeywell 6-bit code.

The translator can be used only with 9-channel tape drives and is limited to the characters A through Z and unpacked digits 0 through 9 plus 28 special characters.

First delivery of the option, priced at $100/mo, is scheduled for the third quarter of 1971.

# *News Wrapup*

## Mobil Gets Prater and Wei Patent

NEW YORK – The Prater and Wei patent has been issued to the Mobil Oil Corp., New York.

The patent application was the center of a landmark case on computer programs that evoked a decision from the Court of Customs and Patent Apeals [CW, Aug. 27, 1969] allowing that computer programs could be patented, but the court did not uphold the claim for a patent on the process itself.

The Prater and Wei appeal from Patent Office rejection of the application was the leading case among several that led to relaxation of Patent Office policy against granting patents for programs.

The patent covers the reduction of data from spectral analysis, a technique for determining the kinds of gases and their concentration in a mixer. The inventors, Charles D. Prater and James Wei, perform computer research for Mobil.

## One Programmer Holds Out Against Union

LONDON – And then there was only one.

Only one of the 19 programmers at the Coventry factory of Rolls-Royce, who have been fighting for the right not to join the Clerical and Administrative Workers' Union, has refused to join after an ultimatum from the company.

The solitary rebel has been given one more week to decide whether he should be redeployed to the Bristol factory or be dismissed.

Rolls-Royce has signed an agreement giving the union 100% membership at the Coventry plant, but the programmers demanded no one should be forced to join any union.

One of the programmers was exempted from joining on grounds of conscience.

## World Bank Forms Computing Department

WASHINGTON, D.C. – The World Bank has established a new Department of Computing Activities to begin functioning Feb. 1.

The new department will be headed by Mervin Miller of the University of Wisconsin.

World Bank Group President Robert S. McNamara, in making the announcement, cited the increasing importance of DP in the work of the World Bank Group and the more widespread use of computers internationally.

The department will primarily develop such information retrieval systems, management information systems and computer processes and methodology for gathering and processing statistical and economic data as are required in the conduct of the work of the bank group.

## Canada DP Salary Growth Down in '70

TORONTO – "The current business climate" is blamed for the slow rate of increase in salaries of computer professionals for 1970, according to the annual review by Kates, Peat, Marwick and Co., management consultants based here.

Results of the study indicate a general increase of between 7% and 8% over 1969, compared with the 11% to 12% reported in 1969.

Average cross-country salaries, shown by the study, range from $4,300 for a junior clerk doing data control work through senior programmers at $9,100, to directors of management information systems and services at $21,800.

The study also reveals that Montreal is well ahead of Toronto in big salaries in the DP field.

## L.A. Considers Computer for Port System

LOS ANGELES – The harbor department will inquire into a computer system for the port of Los Angeles similar to the operation at the Seattle port, according to a proposal made at a Harbor Commission meeting.

The Seattle port uses the system to control incoming and outgoing traffic and to handle the cargo, thus making the turnaround faster. The system costs Seattle $8,000 a year.

Fred B. Crawford, assistant general manager, said that a thorough study by an outside firm would be needed to determine the feasibility of a computer for the port.

## But What Happens When Liquor Is Tested?

WINTER HAVEN, Fla. – Score one for humans.

Scientists at the Citrus Experimental Station in Lake Alfred have discovered that when it comes to testing the flavor of Florida orange juice a computer can't hold a candle to human taste buds.

Scientists recently tried to match on the computer 15 measurable properties of orange juice, such as sugar to acid ratio, oil content and color, with ratings from a panel of humans.

The results: a combination of many factors makes up the right flavor of orange juice and the balance is so delicate that the computer cannot decide on the right flavor.

## British to Continue Inquiry Into DP Industry

LONDON – The Select Committee on Science and Technology will continue the inquiry into the computer industry which began in the previous session of Parliament. A new subcommittee has been appointed to continue the work of the previous group. It is expected to examine "the prospects for the UK computer industry in the 1970s, including the possibilities of international collaboration and the function of government in the field both as policy-maker and user."

# ACM Seminars Boost Jobless Members

By a CW Staff Writer

NEW YORK – Unemployed ACM members are now getting help from that organization in the form of free job-hunting seminars.

ACM is "absolutely amazed by the response" according to George Capsis, and the first seminar was oversubscribed the first day it was announced. The next seminar will be Jan. 19 at 6 p.m. at ACM headquarters, 1133 Avenue of the Americas. Additional seminars will be held each Tuesday as long as there is a demand, Capsis added.

The seminars will be conducted by Herb Halbrecht, a data processing consultant and principal of Halbrecht Associates. He will be joined by a panel of other personnel consultants and people who hire computer professionals.

Topics covered will include: writing a resume, using placement consultants, interview techniques, the job situation, and avoiding future unemployment.

After a presentation by Halbrecht and the panel, each participant will have a personal consultation with one of the panel members.

The consultation will include a mock interview and an evaluation of the individual's resume. Also, the interviewer will consider the individual's personal job problems and attempt to clarify the jobs for which he is suitable.

In addition to running free seminars for its members, the ACM is also offering free desk space and telephone use at its New York headquarters for members who are job hunting in New York.

The seminar is being conducted by the national ACM in cooperation with the New York City chapter. ACM will help set up similar seminars in other cities if local chapters are interested, according to Capsis.

"Most of the people who are now unemployed have never looked for a job – many don't even have the vaguest idea of how to write a resume," Capsis explained. Therefore, the first object of the seminar is to provide technical information to aid people in job hunting.

But the seminar also has a partly psychological purpose. "Being unemployed is psychologically debilitating," Capsis noted. The seminar will "show that somebody cares," give people direction, and allow them to talk to other people in the same situation.

# A PhD May Not Help

By Robert L. Glass

Special to Computerworld

SEATTLE – The possibility of a glut of computer science PhDs is becoming more apparent in these economic doldrums.

This fact was pointed out by Prof. Jerre Noe, chairman of the Computer Science Group, University of Washington, at a recent area ACM meeting.

"The national capacity for PhD production is about 300 annually," said Noe. "Only modest increases in existing programs will meet the needs of the 70s, according to some estimates."

Noe drew his information from the writings of various authorities in the field of computer science education.

The need for those with a Master's Degree in computer science is 10 to 20 times greater than that for PhDs, Noe said, and there are no warnings of overproduction at that level. The potential for undergraduates also seems much greater than current production of PhDs (about 1,000) far exceeds the demand for them (about 200).

Noe also felt that computer science had clearly emerged as an academic field, with a core curriculum that sets it apart from other established disciplines.

Growth in enrollment and in the number of institutions teaching computer science, he said, has outstripped estimates made just a few years ago – particularly in undergraduate education.

# Four Months Later— And the Navy Finally Gets Its 6400 Running

By Alan Drattell

CW Washington Bureau

WASHINGTON, D.C. – A Control Data 6400 computer system was reported up and running last week – four months later than it was supposed to be.

The leased system is installed at the Naval Ordnance Laboratory (NOL) in suburban White Oak, Md., and is expected to provide NOL with management data on classified and unclassified types of applications.

NOL and Control Data officials were reluctant to explain fully what caused the delay, but a user of the system, Alan M. Letow, associate director of the Naval Antisubmarine Warfare Data Center, said that the uniqueness of the 6400, he believes, contributed to delaying early acceptance of the system.

During the delay, the Navy resorted to renting time on a CDC 6600 as well as using the equipment slated for replacement in parallel.

The NOL computer has 20 peripheral processing units instead of the normal complement of 10, necessitating a longer period of time for debugging the operating system, according to Letow.

The software obstacle, he said, is symptomatic of an overall problem that affects many users. "The computer industry," Letow explained, "is not selling systems. It's still selling hardware. I, and other users, want a system that will operate with software and hardware as a complete system."

Letow admitted that when the 6400 works "it's great." The machine is replacing two IBM 1401s and an IBM 7090, and according to a NOL spokesman the magnetic core memory of the 6400 is four times that of the 7090. High-speed random access disk files have a capacity in excess of 100 million 6-bit characters.

"A program that ran 20 minutes on the 7090 takes only several minutes on the 6400," Letow added. His unit is using the CDC computer for the fleet ASW data analysis program, among other applications.

Letow said that the Naval ASQ Data Center has already spent $100,000 in conversion costs to get its applications on the 6400. "In the long run, we anticipate being able to operate at lower cost on the 6400 than on the 7090," he added.

The user said that many of the people at NOL "were aggravated" by the situation. A NOL spokesman would only comment that the lab's personnel "were disappointed" in the failure of the 6400 to operate properly on the originally scheduled date of Sept. 1. The system had been delivered about a month earlier.

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# Battle to Eliminate Air, Water, Noise Pollution Finds Powerful Ally in DP

Computers are definitely playing a major role in the pollution battle.

Without the computer, the battle to reverse the tide of air, water and noise pollution might well be lost. The speed, versatility and flexibility of computers make them integral tools in performing tasks that might otherwise take too long, be too complex, or cost too much to perform.

Without a computer, the effort to regulate water pollution by the Minneapolis-St. Paul Sanitary District would have required the construction of a complete separation of the storm and sanitary sewer systems, a project costing in excess of $200 million and taking years to complete.

Instead, the MSSD installed a control system, which includes a medium-scale PDP-9 computer from Digital Equipment Corp., for less than 1% of the cost of the former project. The computer obtains around-the-clock measurements of water quality from automatic sampling and analyzing equipment in the nearby Mississippi River and then directs the most polluted water to a treatment and purification plant, and cleaner water into the river.

Scientists are not only interested in preventing water pollution but also in learning how pollutants travel in water. This latter problem is being worked on at the Pacific Northwest Laboratory Division of Battelle Memorial Institute, Richland, Wash., where a PDP-9 computer system is providing engineers with data in five minutes that would have required 25 hours to obtain without the computer.

### Behavior Effects

Scientists at the National Air Pollution and Control Administration of the Public Health Service in Cincinnati are using a small computer to study the physiological and behavioral effects of pollutants by experimenting with laboratory animals.

The computer is used to take life function readings from test animals both when awake and asleep.

Low cost small computer-based infrared spectrometer systems are used by federal and municipal agencies throughout the U.S. to measure pollution in the air. For example, in New York City, the daily air pollution index heard by millions of people over local radio stations is calculated by a computer costing about $20,000.

The PDP-8/I computer is operated by the city's Department of Air Resources, which has 38 remote measuring stations located throughout the city to measure the levels of sulphur dioxide, carbon monoxide, smoke, and such weather information as wind direction, wind speed, and temperature.

Noise is one form of pollution which in specific cases can have very severe effects of man. In a concrete bunker at a former Army camp in Tulalip, Wash., engineers from The Boeing Company are using a data gathering system based on a small computer to help make the world's largest commercial turbofan jet engine one of its quietest engines.

Official of New York's Bureau of Technical Services inspects data from PDP-8/I computer-based air monitoring system.

# Motorist Gets Stung by 'Small Bugs'

NEW YORK – Although not a failure, this city's new computerized Parking Violations Bureau (PVB) appears to be a classic mediocrity.

Established last July [CW, June 10, 1970], the bureau was to collect millions of dollars from the 72% of all traffic fines which go unpaid.

After four months, collections were slightly behind the identical period last year, and the computers sometimes sent out double warnings, and in at least one case, warnings to innocent parties.

Late last year, several "small bugs" resulted in a threat to attach a lien to a lawyer's house and stop his motor vehicle registration.

Attorney Irwin Young says he never received a parking ticket in his life, and although PVB Director Anthony H. Atlas reportedly agrees, the computer keeps sending Young reminders to pay, "or else."

After having the matter "dismissed" by PVB, which keeps track of more than 88,000 summonses a week, Young received a registered letter warning him of a "final notice before judgment."

The computerized letter warned him of the impending lien against his house, and threatened him with a "stop registration" procedure when he tried to renew his motor vehicle registration.

Atlas told Young not to worry, that others are in the same boat, and that no "stop registration" notices have been sent to the Motor Vehicle Department, yet.

Atlas noted: "[Young] knows the case was dismissed, we know the case was dismissed, and the machine knows the case was dismissed. But, for some reason or another, the machine is not grabbing the information and erasing its memory."

Several "small bugs" in the system sometimes result in similar errors with other drivers, the director added.

On the positive side, the bureau has freed 18 criminal court judges from involvement in traffic cases, and also made available last year an additional 100,000 man-hours of police time.

Atlas has been unavailable for comment, but PVB Controller Abraham D. Beame reported the bureau and the criminal courts had managed to collect $11.6 million in fines between them in the PVB's first four months of operation.

Collections by the criminal courts for the same four months in 1969, before establishment of PVB, were $11.7 million, Beame commented.

The criminal courts still prosecute more serious motor vehicle violations, like drunken driving, but PVB handles minor and standing violations.

# A Duplication of Numbers Almost Made Him Rich

CINCINNATI – Otis Mazion almost became a rich man when he received over $8,000 intended for another person because of a duplication in assigning vendor numbers through a bill-paying system.

Mazion returned the money to Mabley and Carew Co., a local department store, after it was disclosed, apparently through an audit, that he had cashed four checks totalling $8,312.12.

Mazion reportedly had performed various services for the store, but had not done so in several months, and his "vendor number" was assigned to a new company. In the data base of the store's IBM 360/20, however, Mazion remained as the proper person identified with the number.

Store officials were generally silent about the matter, and could not explain the double-assigning of one vendor number.

A security officer for the store originally said a "freak" keypunch error caused the problem, and that operators were fired.

But a data processing official of the store said "no one was released," as a result of the foulup.

The checks were written in September and October, but the store could not locate Mazion until filing a suit in Common Pleas Court here around Thanksgiving. The store dropped the matter when Mazion returned the funds.

# Used Computer Market Expected To Force Reevaluation of Buy/Rent

By Michael Merritt
CW Staff Writer

The development of the used computer market will force all computer users to reexamine "the purchase/rental decision," according to a report by the Boston Computer Group, Inc.

The report, "All About Used Computers," contends that in the absence of a used computer market the residual value of a computer (its worth after it has been completely depreciated) was generally pegged at zero.

"With some third generation machines presently trading used at 70% or more of original value after years of use," Boston Computer Group chairman William L. Gordon said, the decision of whether to buy or rent a computer is much more complicated.

Gordon said that resale value of used computers is highly dependent on the nature of the equipment. He cited as an example the workhorse 7094s, which are currently available at minicomputer prices and worth far less than the 1410s that supported them.

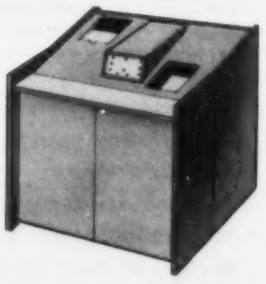
"As soon as you strip some of the mystery away from the [computer] equipment, it begins to look like other capital equipment," the chairman noted. Manufacturers regularly deal in used machine tools, for example, but the computer industry is just beginning to break out of the habit of renting and returning equipment, he said.

The consultative report details present and projected price levels for individual systems or components for all generations of machines. It also presents lists of U.S. and European used computer brokers, independent maintenance service organizations, reconditioning operations, and leasing companies.

The report is available for $275 from the Boston Computer Group, 15 School St.

### Horse Trading Renewed

ARDMORE, Okla. – Trackdown, Inc. uses a computer to match prospective buyers and sellers of quarter horses. Information stored includes price, breeding, training, and age.

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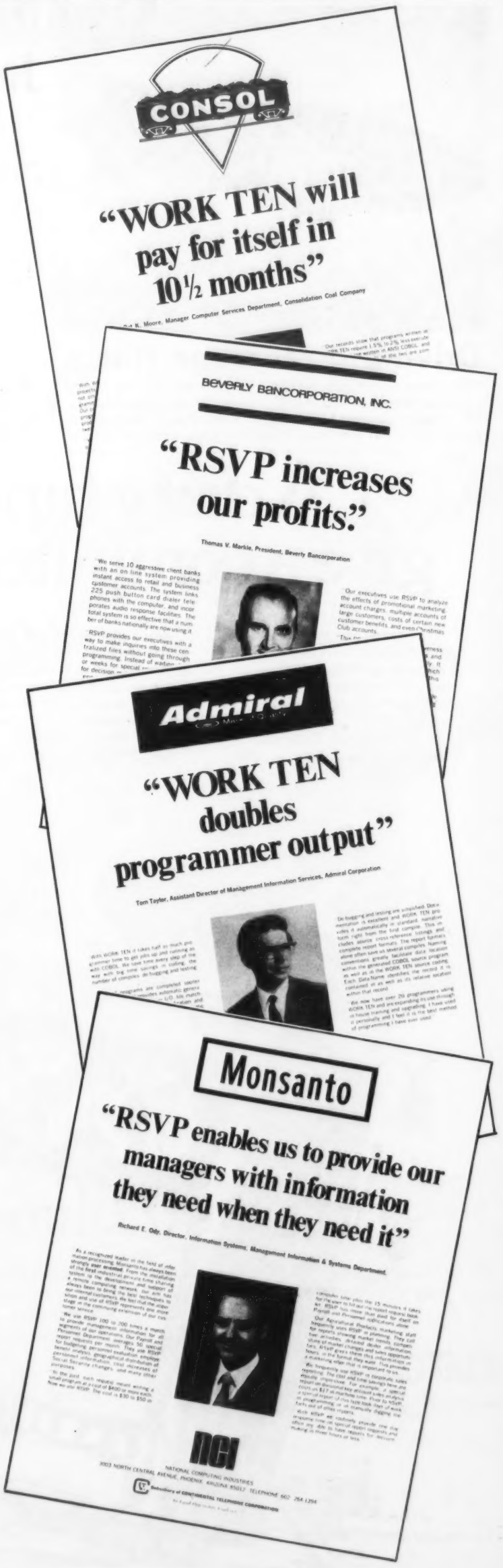
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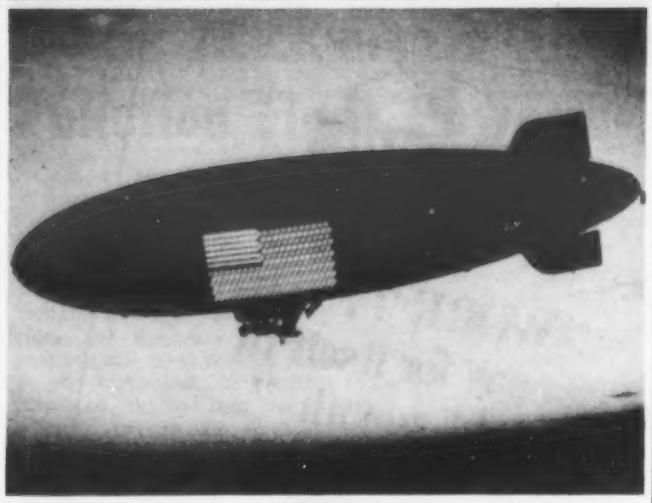

## Driving a Message Home

"Old Glory" shimmers through the evening sky by use of computer-controlled lamps aboard the Goodyear blimp America. The airship's messages begin as animations, then are recorded on digital tape drives and finally are played back aboard the airship.

### CPP Posts Bail

# Judge Refuses to Release Squire

By Joseph Hanlon
CW Staff Writer

NEW YORK – Bail has been posted for Clark Squire, but State Supreme Court Justice John M. Murtagh has refused to release him.

Squire, a computer programmer, is one of 13 Black Panthers on trial for an alleged bomb conspiracy. He has been in jail since April 2, 1969. The $50,000 bail was raised by Computer People for Peace.

Murtagh, who is conducting the trial which began Sept. 8, said that he was revoking the bail of Squire and the other defendants still being held in jail because of "information in possession of the court" relating "not only to the defendant Squire but to all the defendants."

Murtagh did not elaborate on the information.

Murtagh's action surprised Squire's supporters who had expected little difficulty getting Squire released on bail. Gerald Lefcourt, one of the defense lawyers, said that just the previous week Murtagh had complimented the defense lawyers and defendants on their improved behavior.

Ann Rosenberg, a member of Computer People for Peace (CPP), declared: "They are trying very hard to convince us that we can't work through the system."

A demonstration organized by CPP to protest Murtagh's action drew an estimated 200 people outside the courthouse Dec. 30. There were no incidents.

Had it not been for a clerical error, Squire would have been released without the matter ever coming before Murtagh. In April 1969, bail for all of the defendants was set at $100,000 each. But Squire and Michael Tabor were placed in jail in Queens, where another judge cut their bail in half.

When CPP attempted to post bail for Squire Dec. 23, they found that the record book still said $100,000 bail. Since the court had already adjourned for Christmas, nothing could be done until Monday, Dec. 28. At the beginning of the session, Charles T. McKinney, another of the defense lawyers, asked Murtagh to correct the error in the book. Instead, Murtagh revoked the bail.

When McKinner and the other lawyers protested, Murtagh accused them of acting contemptuously toward the court and of conspiring with the defendents to disrupt the court. The lawyers denied it.


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## Penney Finds Way To Handle Orders

MILWAUKEE – J.C. Penney Co., Inc., relies on computers to fill customer catalog orders at a rate of more than 100 a minute in peak selling seasons.

Although nearly 150,000 orders from 1,000 catalog stores can arrive daily, Penney's is able to get the filled order out of its distribution center within 24 hours.

The system determines storage space, plans placement of merchandise, produces a customer bill, provides a list of "best sellers," and prepares information for customer directories.

Working from the computer-printed picking ticket, catalog center personnel know what to pick and when, where to find the merchandise, the sequence in which it should be packed and the warehouse loading dock it is to be sent to so all the merchandise for an individual customer or catalog store leaves at the same time.

Penney's uses two IBM 360/65s to help control the flow of orders and merchandise in a center stocked with more than 130,000 items and large enough to unload 20 railroad freight cars at a time from inside.

## UK Software Firm Aids IBM

CW European Bureau

HAMPSHIRE, England – IBM has completed the transfer of a part of its overall management information system from New York to Havant in the UK. For the first time, statistics on the activities of the company's customer engineers world wide will be circulated from a new Centralized Data Processing Program (CDPP) operating at Havant.

A new suite of programs for the task was designed and implemented by IBM in conjunction with a six-man team from British Computer Analysts and Programmers Ltd., and went live, on time, eight months after the CAP team moved in.

The CDPP compiles world, area and country statistics from customer engineer call report cards and inventory information and transmits them to New York and the countries involved.

It provides IBM management with more detailed information on the time spent by customer engineers and with comparisons between actual and achieved maintenance patterns broken down into various machine categories.

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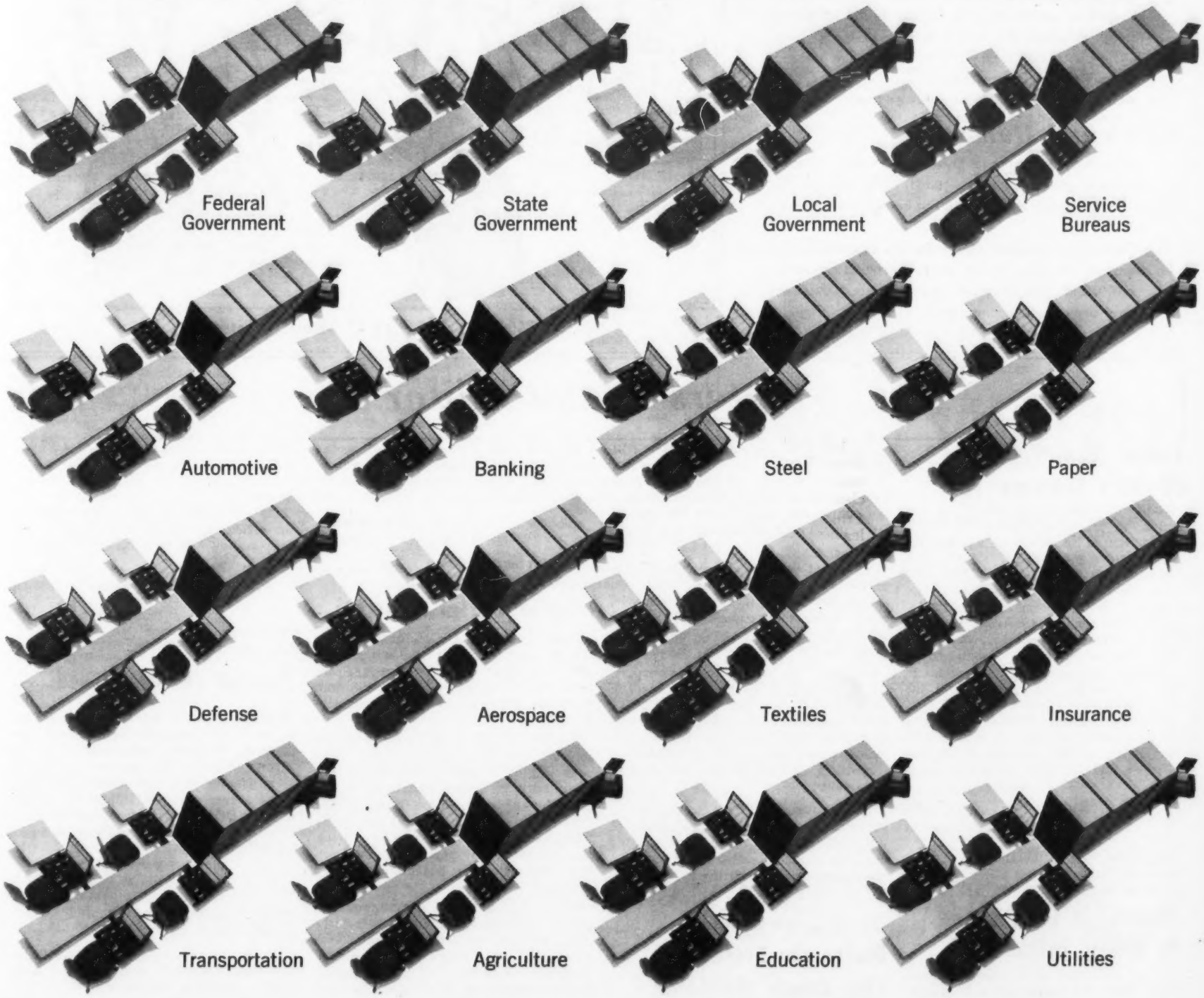


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# Editorials

## The Independents React

Last week the independent peripheral manufacturers met IBM's new lower prices head-on by reducing their own prices.

The price cuts mean that the user now will be able to save even more money by using independent peripherals.

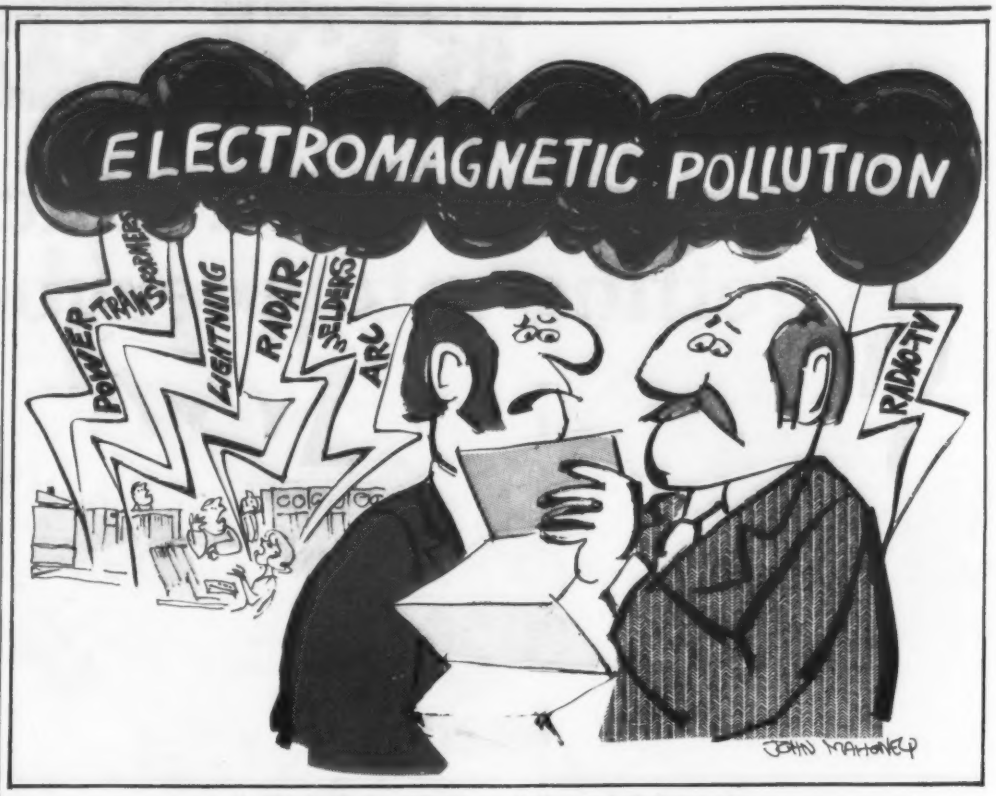
But, while we favor lower prices, we hope there won't be another round of price cutting in the immediate future. If prices are forced down too quickly, the independents won't be able to afford the research necessary to remain competitive.

And that could make the user the real loser.

## Accidental Humor

Apparently the computer mystique isn't dead. A recent new product announcement stated: "User will pay for use of the equipment but will not be penalized for idol time."

The economic crunch apparently has made at least one company more modest. Its last new product announcement stated: The company "manufactures a complete line of small purpose computers."




*'I Think We're Victims of Natural Sabotage'*

# Letters to the Editor

## Reader Lauds Exposure Of IBM's Software 'Fat'

Kudos to Alan Taylor! Again, he has struck, in his direct fashion, at IBM's jugular vein in his article on 'Amigos.' (It is about time someone exposed the inefficiencies in its software systems.)

We can conclude that Taylor has just begun to scratch the surface and expose the fat buried in IBM's software packages. If this is true in the utilities and perhaps the Cobol compiler, what about IBM's other packages such as the "system library maintenance programs" and the over-complicated Sysgen procedure?

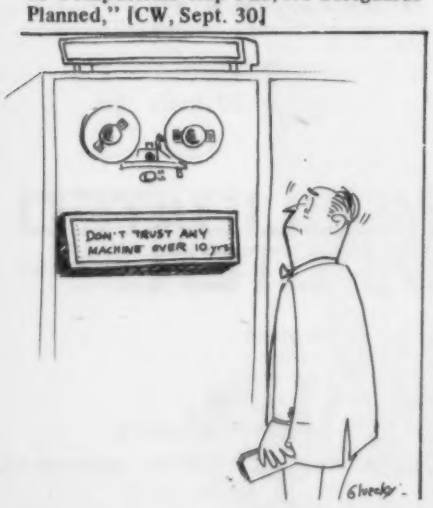
It would seem that with all the personnel IBM has at its disposal, it should be the leaders in the industry in efficient software and not just manufacturers of PTFs.

Richard A. Ross
Sr. Systems Engineer

Colt Industries, Crucible Inc.
Specialty Metals Division
Syracuse, N.Y.

## 'Misuse' of Data in File By Honest Police Cited

I was interested in J. Edgar Hoover's letter [CW, Oct. 28]in which he stated he felt the professional ethics of law enforcement officers had been unfairly impugned in the article captioned "FBI to Computerize Rap File; No Safeguards Planned," [CW, Sept. 30]




The accompanying editorial, "The FBI Missed the Point," also missed the point. It stated there might be dishonest policemen who would misuse the information. I hope this letter will illustrate how honest law enforcement officers can also misuse it.

In the last year the police departments of the 10 small Kansas cities which are suburbs to Kansas City installed terminals which access the Kansas City Police Department computer, and I assume also access the FBI NCIC system.

Recently the Scout-Suns newspapers, which publish 10 weekly newspapers in these suburbs, revealed that the Lenexa Police Department was using its terminals to inquire, upon request of Lenexa apartment owners, into arrest and conviction records of prospective tenants of their apartments.

In defending this "free" service to the businessmen of Lenexa, a spokesman of the Lenexa Police Department pointed out that several "undesirables" has thus been kept out of that little city.

S.C. Hunt

Shawnee Mission, Kan.

## Design the System First, Then Create the Forms

The Taylor Report [CW, Dec. 9] is particularly interesting because I have run across many of the things that he talks about concerning computerized billing, grade reporting, etc.

I have been in the data processing business about 20 years and have concluded that forms designers should be data processing oriented. They should understand how to design an entire system so that they will know about data origination, processing, and final output.

Many times I have been given a form layout and told that this is the way it must look. To produce such a report necessitated difficult key-punching, massive control panel wiring or programs, and lengthy procedures. Whereas, with knowledge of how the system could work, a few changes in the form design would have made the whole thing so much simpler.

Perhaps the correct approach would be to design the system, then design the cards and forms. I have used this approach in our business and it works beautifully, particularly since all systems and forms design are under the direct control of one person.

Tom Crenshaw
Manager

Computer Service of East Texas
Jasper, Texas

## Program Design Neglected

Recent columns have demonstrated the programmer's preoccupation with Cobol efficiency. May I suggest programs are more often inefficient because they are badly designed, than because Cobol is badly used?

Program design is a badly neglected subject, and one which is only now beginning to be studied and understood. Modularity is a first step towards program design, but we now recognize that even modular programs can be badly written – often as badly as the non-modular programs they replace. So the question remains – how does one design a program?

We are now able to see that all programs exhibit common structural characteristics. Each element in the structure solves a particular well defined part of the total program, which can be clearly stated. Program structures must then be adapted to make programs testable, and to compromise for possible compiler inadequacies or inefficiences. All this constitutes program design.

It is important that compromises taken to compensate for compiler inadequacies are taken after the basic design work has been done. This way round, efficiency is put into its proper context, and turns out to be a much less significant problem.

A.R. Cohen
Technical Consultant

Hoskyns Systems Research Inc.
New York, N.Y.

## Cheers for Paper Ballots

Reader Theodore C. Morrill suggests that a paper ballot reader be developed to eliminate the failure of computers in counting election resutls [CW, Dec. 2].

Cubic Corp. heartily agrees with Morrill and has on the market the Votronics Vote Counter, a device which tabulates votes from the familiar paper ballot. Town clerks in Sharon and Randoph, Mass., have used the Votronics Vote Counter since 1966, with outstanding results.

This system, in use since 1964, quickly and efficiently tabulated approximately three million ballots in the 1970 general election.

Harry Wilcock, Manager
Votronics Products

Cubic Corp.
San Diego, Calif.

## Prisoner DP Questioned

Was interested in the Nov. 25 article on training of Oklahoma penitentiary inmates as computer programmers.

Don't you feel this type of training is inconsistent with the safeguards that many businesses are attempting to set up in their DP divisions to prevent or minimize embezzlement by program manipulation?

R.A. Stratford
DP Manager

Tacoma City Light
Tacoma, Wash.

**Not necessarily. Most inmates are there for crimes other than embezzlement. And even a reformed embezzler could be put to work on applications that did not involve money. Ed.**

## APL Services Has Address

Your Nov. 11 article, "T/S Service Includes Financial Analysis for Planners," referred to the APL Network offering the package. Unfortunately, you listed the addresses of participating companies with the exception of APL Services. APL Services is located at 865 Lower Ferry Road, Trenton, N.J. 08628.

Joel A. Lamb
President

APL Services
Trenton, N.J.

*Computerworld* welcomes comments from its readers. Preference will be given to letters of 150 words or less. Letters should be addressed to: Editor, Computerworld, 797 Washington St., Newton, Mass. 02160.

# There Are Many Reactions to Proud System Designers

Well, one of the things about writing these columns is that you soon find out which items are hot buttons – and which simply cause a yawn. There have been a number of both types of columns during the last year – but the two articles dealing with arrogant computer system designers certainly seem to have hit a real, red hot button.

**The Taylor Report**
**By**
**Alan Taylor, CDP**

Correspondence has come in faster on the idiocies of that school report (which did not bother to spell properly, used too short fields for names, etc. and was just generally bad) than for any other topic this year – not excepting Cobol overhead.

Just to let you see the range of emotions involved, here are a few of them. Here, for instance, is the most distant response so far received – from Dusseldorf, West Germany, by I.G. Cenek.

> Reading your article on "System Designer Is Guilty of the Sin of Arrogance," I want to make the following remarks.
>
> EDP systems have to be a service to humans, and it is never needed; also with Unit record, that the human being serves the EDP systems.
>
> Every EDP man, operator or programmer or system analyst has to promote the service of EDP systems if these services are feasible, in the best way he can.
>
> Every EDP man who does not follow the above rules does not do a good job; this means each EDP man who makes these "errors" is unqualified, because he is ignoring the basic rule of service.

I don't know Cenek, but he seems to know what he thinks. I like his points about human beings not being made to serve EDP systems – and that people designing systems with arrogant faults are, in fact, unqualified!

As far as I know, neither DPMA, nor Afips, nor any of the various computer science courses given in universities, have ever come up with this type of judgment; but that is no reason for saying that Cenek is wrong. He may well have just pointed out why our qualification programs are subject to so much discussion now.

Nearer at home, indeed from one of the capitals of the programming world, Poughkeepsie, N.Y., comes another letter from someone who singles out the good systems as well as the bad ones.

This is what William J. Huebsch had to say on the subject:

> I have read with interest your series concerning poor system design. Billing systems being the major connection and exposure between computers and the majority of the populace, it is no wonder that Walter M. Carlson faces the 'blame computer syndrome' [CW, Dec. 9].
>
> My own experience, familiar though I am with those hulking, beastly number crunchers, has sometimes led me to curse my own livelihood (computer design).
>
> The most frequent offender is the late payment notice bearing the legend 'If payment made within last 10 days, ignore this notice.' I have received these up to three weeks after paying a bill.
>
> Equally bad is attempting to receive credit for cancelled orders and/or non-delivered items. When the trucking strike this past year held up a furniture shipment, I was frequently the recipient of threats of repossession of something I didn't have!
>
> At least the store assured me it would be corrected, and after four months my "Final Notice" arrived the same day as the furniture.
>
> The Capitol Record Club has not yet corrected my account since they billed me in early August for a record not shipped until September. Part of the ensuing mess, due to frequent update of the money owed file but not the money paid file, included my receipt of a letter stating they were sorry I had cancelled my membership – I hadn't.
>
> I will grant, perhaps, that I contributed to the troubles by not paying, but:
>
> - The first furniture bill was received one week after the initial order was placed, on a pay-when-delivered basis.
> - When records are shipped, the first bill accompanies them. I have always paid these, even when part of the order was temporarily out of stock. In the case in question, my "second notice" came before the first!
>
> All is not black, however. The local telephone business office is apologetic and helpful, even when it is my error. In their booklet that came with my credit card, Esso listed where and to whom to write in case of an error. AND they said that such errors were due to people NOT the computer!!!
>
> And after all, computers are moral. The student scheduling system employed by the school in which my mother teaches only allows six characters for first name. Every Virginia is a Virgin.

### Information Input

Note again the number of times that information simply does not get into the system. How on earth can a billing operation proceed for goods held up by a strike! Or does the system designer live in a world where such things do not happen? If so, the sooner he is brought down from his private Cloud Nine the better for all of us.

Perhaps the most aggravating letter, because of who the culprit is, came from D.C. Wright, Jr., director of information services at the Hammer Mill Paper Co. He enclosed a letter received from Remington Rand Division of Sperry Rand Corp. – and claimed that it "must surely be unsurpassed for sheer arrogance." I am not convinced yet about that, but he certainly has a good case. The enclosed letter read:

> Our accounts payable function has been automated as of Nov. 1, 1968.
>
> The following six digit number 376503 has been assigned to you. This number identifies your account and must not be confused with the purchase order number. Effective 10/28/68, we request that this number appear on each of your invoices next to your name, so we may expedite payment.
>
> Failure to include this number on each invoice will result in a 30-day delay in payment, and we will exercise the liberty of deducting cash discounts.

Now, that is quite some time ago; but it still does show just what people think they can get away with under the cover of "it is convenient for our computer."

### Action Required

Naturally, all this activity encouraged me greatly. The only way to do anything about these system designers is for many people to act. The correspondence showed that people were aroused, and prepared to act, and this last letter shows that there is somewhere that this preparedness can perhaps be brought to play officially. Here is Carl E. Diesen, the chairman of the Afips Public Information committee, writing:

> Your articles on faults in the design of computerized systems [CW, The Taylor Report, Nov. 18, Dec. 5] are very valuable. It seems that these design principles have scarcely been articulated at all as yet.
>
> Our Afips Committee on Public Information has been studying this problem and trying to develop plans to help relieve the problem. Could you provide me with a couple of dozen copies of those articles or give permission for me to make them? I would like to distribute them to the committee members and other professional society leaders who are actively concerned with the problem.

So that is one place you might want to pass your ideas along. They seem to be waiting to hear from you.

And, on that point of copying the articles – anyone may copy either of the two original articles, or this one, provided that he copy the full article and include the copyright notice – no further permission is needed. You are most welcome.

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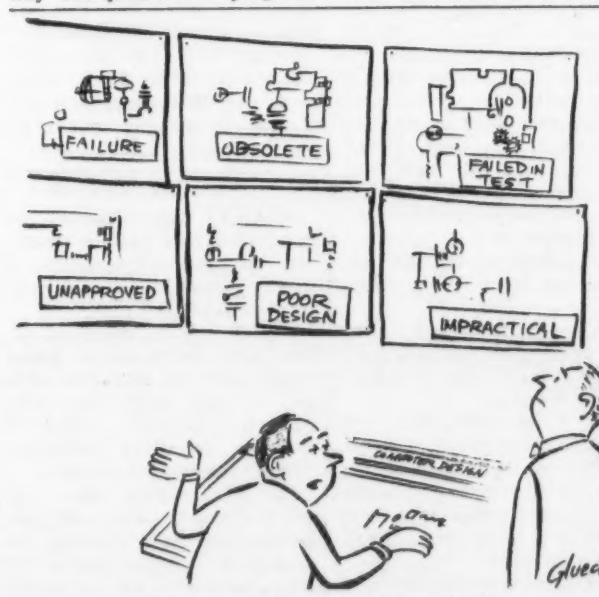


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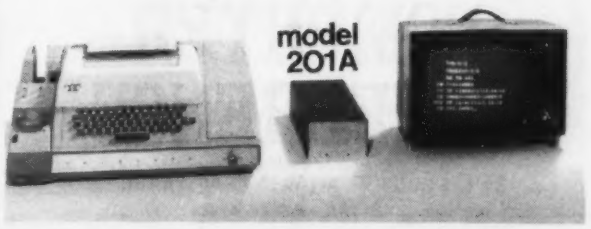


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# Retail Store's Entry Into DP Training Intends to Bring School to the Student

WASHINGTON, D.C. – It is difficult to control an impulse to make light of the scheduled opening this month of Montgomery Ward's computer study center in its store in Wheaton, Md.

The retail chain opened its first EDP study center in its State Street outlet in Chicago last November.

For one thing, students who study at the Ward centers can charge the course to the store's credit card – at the usual 18% a year interest rate. It's like buying clothes, or getting your car repaired. One must wonder, however, how the store will handle repossession for nonpayment.

**D.C. Data-Line**
**By**
**Alan Drattell**

Can you imagine coming into the Ward store in Wheaton and saying you'll take a business programming course? Just wrap it up!

We must also wonder if they'll have special sale days on that and other EDP courses which will lead to a certificate from Ward's, in scientific programming, systems analysis and computer education.

For the guy who needs some brushing up, he can just attend class while his wife shops. The full curriculum will range from 268 to 460 credit hours, so he could go broke if his wife spends all that time shopping.

**No Newcomer**

Ward's is not new to the school business. The chain has graduated more than a million girls from Wendy Ward charm school; 35,000 customers have completed courses in interior decorating; and there are 7,000 graduates in the Detroit area alone who learned to thread their needles properly in Montgomery Ward sewing classes.

Unfortunately, though, data processing cannot be casually linked with learning charm, decorating or sewing. It is much more complex – and in many ways more serious. The student who goes to a private EDP school is attending so that he can learn a vocation, not how to tat in his spare time.

Ward's has taken a serious approach to its computer school effort. Advanced Systems Inc., a Mt. Prospect, Ill., company that specializes in training, will actually run Ward's two computer centers as part of a pilot project. And if the project gains acceptance and is successful, ASI and Ward's are expected to sign an agreement covering centers in 100 stores.

**'Convenient Schooling'**

"The project," said Mitchell Morris, ASI vice-president, "ties in with our company's philosophy, which is to bring the school to the student – make schooling convenient for him."

ASI specializes in providing videotaped courses, and these types of lectures will form the heart of Ward's school program. Classrooms will be equipped with study carrels, videotape players and television monitors. Individual instruction, however, will be available to complement printed and visual study materials.

To the computer professional, the benefits that may come from the Ward-ASI program tend to be outweighed somewhat by the humorous aspect of a retail store in the data processing business. Some wags add that retail stores are having enough problems with their own computer billing operations.

But the project is indeed a noble experiment and one that could work quite well. Certainly, Ward's and ASI are no fly-by-night outfits – a fact which many more "authentic" computer schools cannot claim.

## Art Strickland

# Language Owes Much to Computers

During my recent recuperation (having been trampled in the rush to get to my company's first APL terminal) I had lots of time to read. And read, and read. My associates brought me the company memoranda, updated versions of all the important documents, and yellowed copies of *Computerworld*.

As I pursued my study, I began to realize the tremendous variety of contributions the computer industry has made to our culture.

Even the industry's media, I told myself, could not have reached their present sophistication without automation. Then it hit me.

The supreme contribution of the computer industry has been to that most fundamental of media, the English language!

**English Has Been Refined**

Improving and refining the great advances of earlier American business, the industry has virtually redecorated English writing through its fantastic volume of technical manuals, program documentation, brochures, and sales proposals.

The industry has polished and popularized that beautiful and expressive style which had developed but slowly over the last half century.

To test my theory, I asked one of the bright young men in my department – one who has not only learned quickly but made contributions of his own – to memorize the content of a famous, 100-year-old American document.

When he had it in mind, I asked him to write it out in his own words. I offer his work as documentary evidence of the tremendous debt to our industry of the entire English-speaking world!

**Familiar, But Different**

"Eighty-seven years ago a unique type nation was initialized at this continent location by our predecessors. It supported the liberty concept, and its major emphasis was the proposition that all individuals are provided with equal capabilities in the rights area.

"At this point in time, we are involved in a significant internal power struggle, the purpose of which is to determine whether that nation, having the above attributes, can remain viable.

"This meeting is being held on a great battlefield of that conflict. The purpose of the meeting is a partial field final resting-place dedication for those who finalized their lives in order that the nation might continue successful operation.

"The feasibility of this approach has been firmly established.

"But, in more general terms, the dedication, consecration, and hallowing of this ground by us is not feasible.

"The brave individuals, existent and non-existent, who participated in this phase of the project, have provided an escalation of consecration to a level beyond our capability to augment or diminish.

"The few comments we may make at this point in time will probably not be fully recognized or remembered more than a few quarters, but their accomplishments in this environment cannot fall through the cracks.

"It is for those of us who are still alive to achieve a dedication to the follow-on work which those individuals who met the competition here have given their best effort.

"It is for those of us here to work toward total commitment to our remaining assigned tasks – that from these honored dead we provide ourselves with increased motivation in all areas of the ongoing cause to which they gave their last full devotion measure; that in this meeting we commit to make the deaths of these individuals profitable; that this under-God type nation shall be reinitialized in the freedom area; and that people-oriented government shall continue to be in the on-going mode."

### 90 Seconds and It's Free

OMAHA, Neb. – Visitors at the State Fair's Hall of Health this fall were able to receive a free lung checkup that took only 90 seconds of their time.

A minicomputer compared information contained on forms filled out by the volunteers with known lung health standards, allowing a doctor to determine quickly whether additional medical attention was needed.

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## How Good Earth Can Be Better

NEW YORK – Computer users who are concerned for the ecology, but who have too little paper waste to warrant saving it for recycling, may find a useful end for their output after all: burying it for fertilizer.

Recent published reports indicate that using scrap paper for mulch "controls weeds improves soil texture, and regulates moisture and temperature beneficially."

During the past several months, it was revealed that computer output paper and cards can be recycled profitably, but a large volume is needed before most salvage dealers will pick it up.

Shredded newspapers have been used for years to create humus which is readily incorporated into the soil, and printer's ink is said to contain tracer elements important to plant health and growth.

Any chemical difference between newspaper and computer paper might have an effect on "bit fertilization."

The assistant director of a university computer center suggested it would be a good idea for some agricultural colleges to experiment with computer output paper, since such a sizeable quantity is generated.

The main problem, according to another user, would be with cards, which cannot be "buried" without separation because the decomposing would take such a long time.

## Agency Has 'Ultimate' System

# Burns Takes Security Seriously

By Peter F. Carr
Special to Computerworld

BRIARCLIFF MANOR, N.Y. – "We set out to build what amounts to a maximum security center to house our computer when we moved our data processing facilities from New York to our present location. And, as a detective agency, we wanted to practice what we preach," said William E. Porter of the William J. Burns International Detective Agency.

Porter, vice-president and treasurer of the company, recently demonstrated the invulnerability of his DP center for CW.

"In planning the building, our chief consideration was the amount of protection we should give the facility," he said. "Our applications include accounting, billing, accounts receivable, cost analysis and price determination. We also have a 29,000-man payroll. If our computer were accidentally or maliciously wrecked, we could be in serious trouble.

"We began with a perimeter defense on the building itself which covers every door and window. Any unauthorized attempt to enter the building will trigger a response at the guard position here, and at the central control station nearby at White Plains," he said.

### Receiving Centers

Central stations are basically the receiving centers where signals from the warning equipment are received on a 24-hour monitoring basis. When any of these signals are activated, the guard knows exactly what action to take, and immediately notifies the police or the fire station.

"As soon as a person enters the building, and no matter where he enters it, he will run into ultrasonic traps. This equipment transmits inaudible sound waves and detects any motion in the area. When you have the whole building soaked with these devices, there is no way to step inside without setting off an alarm," Porter asserted.

The motion and sound detector system is independent of the perimeter warning system and also reports to the guard force and to the control station.

### Authorization Needed

Although the computer room itself is on the ground floor and has a number of windows and doors, unauthorized entry to the facility is virtually impossible due to the elaborate warning and access control devices.

To enter the data processing area an individual must pass through two maximum security doors, both of which are operated by a card reader. The first door gives access to the data processing area as a whole but not to the computer room itself. In this first area, all systems design, programming and keypunching work is done.

In addition to thorough security checks on each individual employed, the people who work in these areas are issued personal ID cards which have been treated to activate the first card reader, so that the individuals involved can go in and out of the area without difficulty.

This card will not operate the second maximum security door which gives access to the computer room itself. People who have normal business in that room, such as the computer operators, librarian, the operations manager, and the assistant operations manager, have cards that will operate both readers. In addition, the computer department manager, the head of the administrative services, and Porter himself have a card.

These are the only cards in the country that will open these doors, Porter explained.

The computer room itself is soaked in ultrasonic traps and is kept under surveillance 24 hours a day by means of closed circuit television.

Access doors to the computer room for the movement of material in and out are also maximum security doors, and can only be operated by means of switches within the computer room itself. To move material into the room the mover must telephone into the computer room and get the operators to open the doors.

"We do not have a separate computer system, but we have made arrangements with other people for the use of their computers in the event of a catastrophe," Porter explained.

The company is presently in the process of marketing the security system to protect computer installations throughout the country. Porter explained that the total system would be available for about $12,000, but that a user could purchase only those elements of the system which he thought were necessary to protect his installation from unwarranted intrusion.


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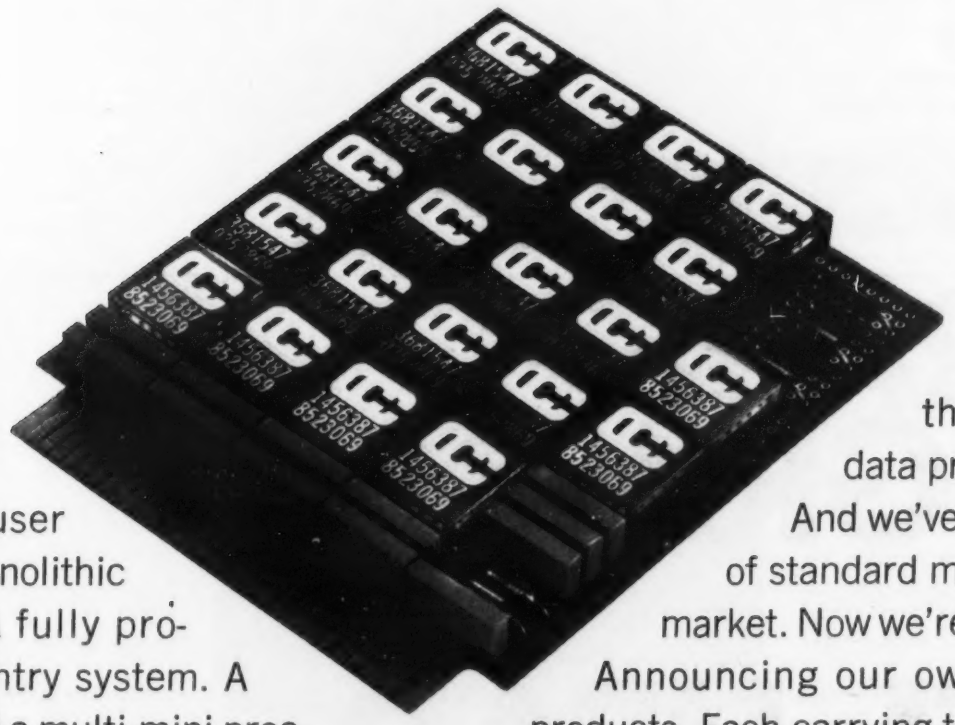

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# Saturday Cartoons Not That Simple

BEVERLY HILLS, Calif. – Graphic manipulation by computer is becoming refined enough to do the Saturday morning TV cartoons.

A system with which an animator can produce a short subject in a couple of hours, or a full-length animated movie in a couple of months, is nearing completion. Created by Computer Image Corp., the system is called Caesar (for computer-animated episodes single axis rotation).

CIC has already done a feasibility film, animating an episode from a *B.C.* comic strip by Johnny Hart. While there are some problems getting the moving characters to register with the background, modulation of the program by the soundtrack produces perfect lip-synchronization.

In operation, the animator produces short sequences of action displayed on a color monitor. He edits them, and when satisfied, stores them in the digital computer's memory.

The animator can string the sequences together, calling them back for display until he is finished.

"What is most significant is that our systems will reduce the cost and time involved in animation back into many areas which no longer can afford animation," said CIC President Bruce L. Birchard. "Industrial and educational animation are two very important areas," he added.

CIC has already completed a learn-to-count series for Sesame Street, completely animated by computer.

The system eliminates the task of assistant animators and the laborious chore of inking and coloring.

Previous CIC systems have already produced title sequences for TV shows and motion pictures.

# Truck Engine Exhausts May Soon Breathe Final Gasp of Pollution

FORT WAYNE, Ind. – Further reduction in the level of air pollutants from truck engine exhausts is the aim of a computerized project at the Motor Truck Division of International Harvester Co. here.

International Harvester, a leading manufacturer of motor trucks, uses an IBM 1800 data acquisition and control system connected directly to instrumentation to analyze engine exhausts during engineering department tests.

The computer prepares detailed reports on the level of hydrocarbons and carbon monoxide emitted by the exhausts of engines under development here.

This information, available almost instantly to engineers, allows them to adjust carburetors or other components as necessary, and retest within minutes.

G.W. Feil, manager of the Motor Truck Engineering Department, said International Harvester's use of the system "has enabled our company to stay within the U.S. Government and state of California's air pollution control requirements for truck engine exhaust emissions."

Government standards limit emission by motor vehicles to no more than 275 parts per million hydrocarbons and 1.5% carbon monoxide.

# Program to Pinpoint Earthquakes

MOUNTAIN VIEW, Calif. – Earthquake hunting by computer is the purpose of a program being written by Sylvania Electric Products Inc. The program will enable scientists to locate almost instantaneously the point on the earth's surface directly above an earthquake, as well as the time of the tremor and its approximate depth.

Designed for the Earthquake Mechanism Laboratory of the Environmental Science Services Administration, the program is at first being limited to California and Nevada.

Seismograph stations in the two states, upon detection of a tremor, will transmit information to a single center, where the data will be fed into a computer.

Computerization will increase the accuracy of earthquake location and speed scientific analysis of the event, according to a Sylvania engineer.

## Church Turns to DP Expert

EDINBURGH, Scotland – The (Presbyterian) Church of Scotland has decided to employ a computer expert to "pioneer relations between the church and the new world of computers."

The appointment, according to a church spokesman, grew out of a recent conference which recommended deeper church involvement in industrial life.

A CRASH PROGRAM FOR ANTI-HEAD CRASH.

Even the finest disc drive devices can fail from head crash. Internal particle density can build up from unstable heads, warped or damaged discs, edge loading or normal wear of the disc surface which all affect head/memory surface operating tolerances. Result: Head crash, with equipment and data destruction and costly computer downtime.

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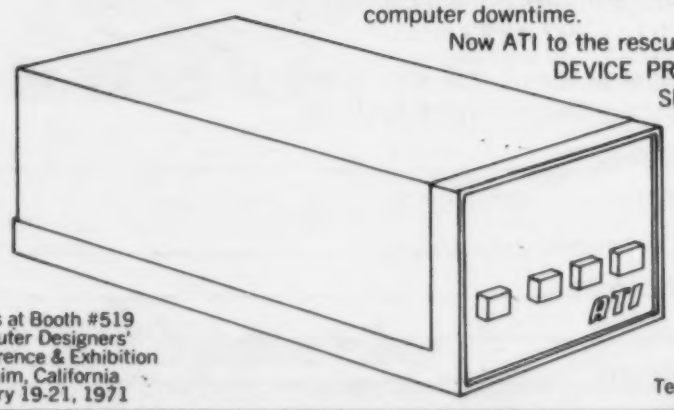


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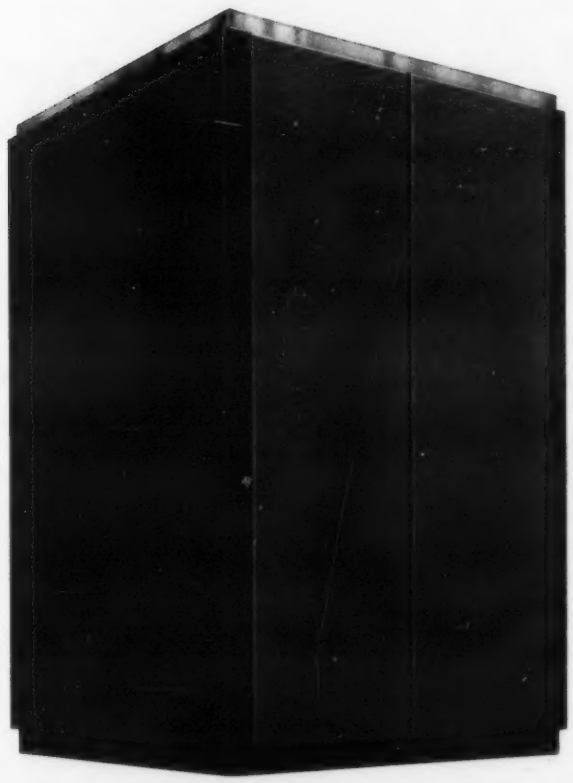
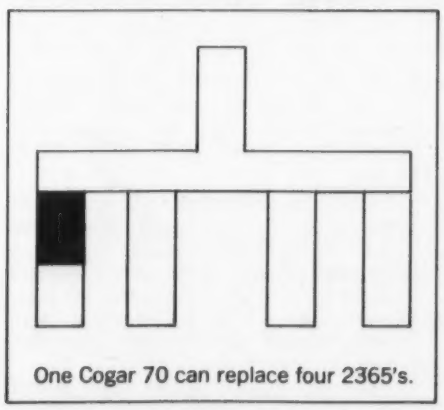
# Cogar announces its 370* generation memory for 360* users.



The first all-monolithic add-on memory system for your 2365 requirement.

It's called Cogar 70. A new generation memory like the one you can get with the new 370. But it's built to plug into your 360. To add system capacity. Improve system performance. Without you moving to a new computer. Or changing any of your present software.

Cogar 70 is small in size. It takes up much less space than other add-on memory systems. But it's big in capacity. You can start with 262 K bytes. And build up to a full megabyte.



One Cogar 70 can replace four 2365's.

Cogar 70 is reliable. Because it's all monolithic, eliminating one third to one half of the solder connections. Because it has its own built-in monolithic storage-protect memory. Because it carries its own fault isolation system.

And, best of all, Cogar 70 is economical. It offers new generation technology. And longer economic life. For substantially less than the cost of core systems with similar capacity.

For example, Cogar 70 meets or exceeds all performance characteristics of a 2365 add-on memory. But it's smaller. Can handle four times the capacity. And costs about 20% less.

All of which makes it the best memory buy you'll find at the end of a plug.

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# Introduction Uses Basic

By Albert Schild
Special to Computerworld

*Basic Programming*, by Van Court Hare Jr., Harcourt Brace and World, Inc., New York, 1970, $5.00.

This paperback presents an excellent introduction to computer programming. The language used is Basic, which lends itself very well for this purpose since it has a small vocabulary and very few rules of grammar.

The first two chapters introduce some of the jargon of computing in a very casual way. The author succeeds in keeping this discussion concrete and down to earth by illustrating new concepts with well chosen examples and analogs.

The Basic language is developed in easy steps with examples to illustrate the use of each new concept as it is introduced.

Subroutines and their uses are considered.

Thirteen worked examples of varying degrees of difficulty provide the reader with a review.

Some extensions of Basic, especially applications to Matrix operations and alphanumeric manipulations, are covered.

Of particular value to the student and reader are two appendices. The first lists and explains the eight essential and seven additional Basic commands. The second lists 40 of the most frequent errors in Basic made by students. In addition there is an excellent glossary of terms used both in this book and in computer literature.

*Albert Schild is chairman of the mathematics department, Temple University, Philadelphia, Pa.*

COMPUTERWORLD

# book reviews

# Fault Diagnosis Viewed With Intuitive Approach

By Oscar Firschein
Special to Computerworld

*Fault Diagnosis of Digital Systems*, by Herbert Y. Chang, Eric G. Manning, and Gernot Metze, John Wiley & Sons, New York, 1970, $9.50.

This book summarizes the research results obtained to date in automatic diagnosis of faults in digital systems, and provides an introduction to the field. The approach used is intuitive rather than formal, giving a bird's eye view of the principal results to serve as a guide to the published literature.

The authors state: "We have not written a 'cookbook' for maintenance technicians, nor have we written a critical survey for the specialist in fault diagnosis. Instead, we have written for graduate students and workers who are active in other areas of computer science. We have tried to provide, for these groups, an introduction to fault diagnosis that will be as quick and painless as possible."

A very brief introduction, and necessary background material, consisting of definitions and models, historical material, and results from automata theory and the theory of testing, comprise the first two chapters.

The book then covers the generation, selection, and verification of sets of tests for digital circuits and systems. Combinatorial and sequential circuits, methods for selecting minimal or near-minimal subsets of tests, and fault simulation methods are discussed. The material assumes the reader has had a first course in switching theory and logical design.

The Sequential Analyzer, a set of computer programs that can generate fault simulation data for a given logic circuit, class of faults, and test sequence is discussed at length.

Several forms of "fault dictionary," arrangements of test results which enable maintenance personnel to interpret the results of tests performed on equipment, including comparisons and tradeoffs among the techniques, are discussed.

*Oscar Firschein is a member of the Information Sciences Laboratory, Lockheed Research, Palo Alto, Calif.*

# Book Allows Readers To Write Programs Within First Week

By Walter J. Samek
Special to Computerworld

*Ten Statement Fortran Plus Fortran IV*, by Michael Kennedy and Martin B. Solomon, Prentice-Hall, Inc., Englewood Cliffs, N.J., 1970, $8.95 cloth, $5.95 paper.

This is an interesting approach to the problem of teaching Fortran, allowing the reader to begin programming within the first week. He is introduced to a minimal subset of Fortran statements, 10 altogether, with which he can write meaningful programs for the solution of many numerical problems.

The installation using this book should have a Watfor compiler, which is extremely fast, reportedly about 10 to 100 time faster than IBM's H-compiler.

The student, encouraged by early success with the 10-statement subset, is then introduced step by step to the other features of Fortran IV.

*Walter J. Samek is employed at Combustion Engineering Inc., in Windsor, Conn.*

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That's right. There are some people who care about your problems. We don't think a girl should spend her whole life bent over a hot keyboard. So we've introduced a new optical scanner/card punch that's going to help you and your boss. We call it the Model 710. And it automatically scans and punches up to 6000 cards an hour. So, smile Holly. That means about a half-million fewer keystrokes a day for you.

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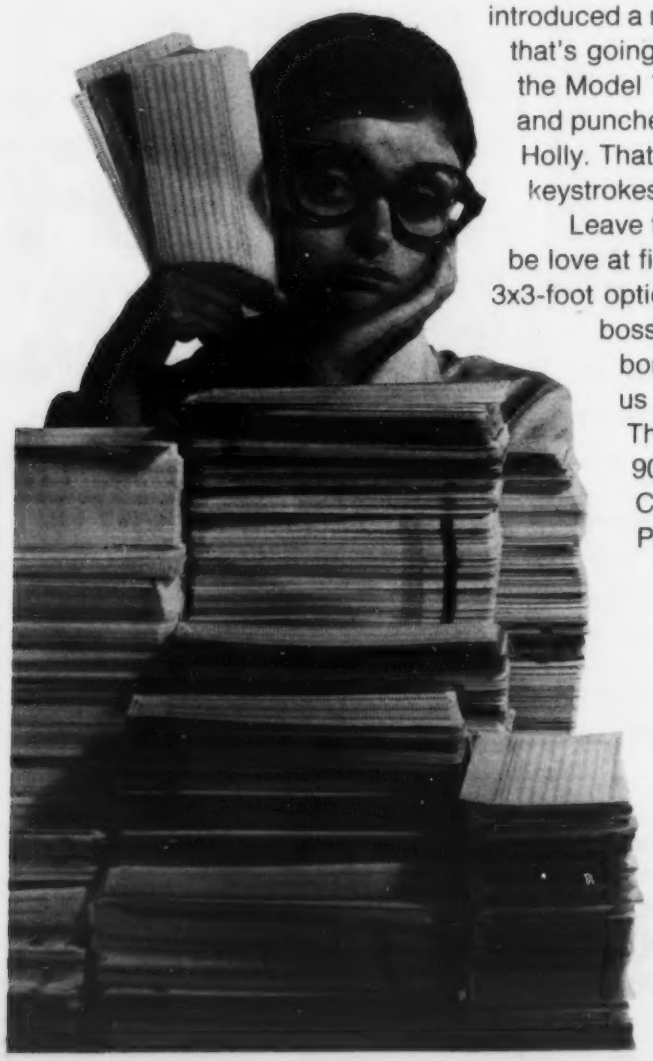

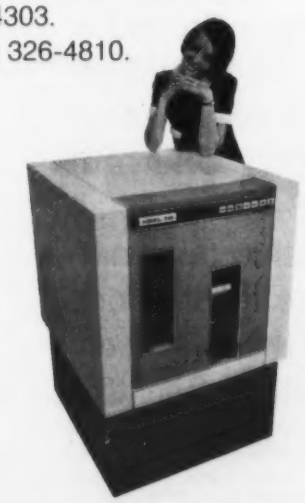

DATA RECOGNITION CORPORATION

# Cogar announces the data-entry system with a heart.

A complete data-entry system. With a Cogar monolithic memory that's fully programmable. A data-entry keyboard. An automatic reel-to-reel tape handler. A CRT for visual display. All brought to life by something new. A heart. A heart that makes Cogar System 4 the most convenient, most versatile data-entry system ever packed in a desktop case. A system that works for people. Where they work. And how they work.

It's a heart-shaped cartridge of magnetic tape. That snaps into the Cogar 4's tape deck. That tells the system what to do. And how to do it. It programs the Cogar 4 at the touch of a key. Without you ever having to prepare a program.

It teaches the Cogar 4 routines for data entry, verification, searching, editing, blocking and communications. Routines that make it an advanced replacement for your present equipment.

It instructs the operator. In plain English. So that the system can be used by a traffic manager, a purchasing agent, a secretary. That means you can move Cogar 4 out of the keypunch room and into remote locations. Where the source documents originate.

It turns the system into a communications terminal. So that it can transmit fully edited, efficiently blocked data from the field to a Cogar 4 located at headquarters.

It gathers and stores data. For batch entry at a central location. For convenient tape oriented record keeping.

It's a heart that gives Cogar 4 a long life. Because it can instruct the system in emerging new applications. So that it won't be obsoleted like hard-wired equipment.

If you're planning to upgrade or expand your data preparation, shouldn't you have a heart-to-heart talk with your Cogar salesman?

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## Tuning in on Raw Sound

# Can Computer Tell Bach From Beatles?

NEW YORK – Sit a computer down next to the radio and let it decide if it is listening to Bach or the Beatles.

That is the promise of a new interface that accepts "raw sound" as an input and can translate it into machine-readable language without coding or control signals.

Developed by Sound Signatures, Inc., of Los Angeles, and Tracor, Inc., the system is said to work on any recorded sound.

The first application developed and discussed in detail is related to radio monitoring and the performing rights industry, which is responsible for determining and paying the royalties to which music composers and publishers are entitled each time one of their recordings is played on the air.

Sound Signatures has also discussed plans to monitor recorded radio and television commercials, so that program sponsors and advertising agencies can be provided with proof of performance.

Another potential service is the compilation of data indicating which recordings are being broadcast on a daily basis in specific geographic areas by certain radio stations, so that record company marketing and distribution plans can be adapted to important and previously unavailable information.

"Our system could have dramatic effects on the performing rights industry which distributes $25 million in royalties each year for recordings played on the radio," said Sound Signatures' president, Louis Sackin.

The system can provide for one million hours or more of broadcast sound to be recorded on tape and converted into a computer language that can be used to identify the recording automatically, accurately, and quickly, the company said.

The system starts with the radio broadcast of a recording and results in a computer-printed list that includes the recording title, composer, lyricist, publisher, recording artist, record company, radio station, and time and date of the recording play.

The identification is made through comparison with a computer library of every recording represented by any of the performing rights organizations that subscribe to the service. The company said the system will be updated constantly to include appropriate new releases. The library will contain all recorded versions of any particular musical composition.

## DJs Turn to DP

**KPRS Radio disc jockey James Dunn notes starting time on announcement log prepared by the station's IBM 3/10. The computer helps schedule and broadcast up to 400 daily announcements, providing a comprehensive schedule of programs and spot announcements. These reports also insure that the Kansas City, Mo., station meets broadcasting regulations.**


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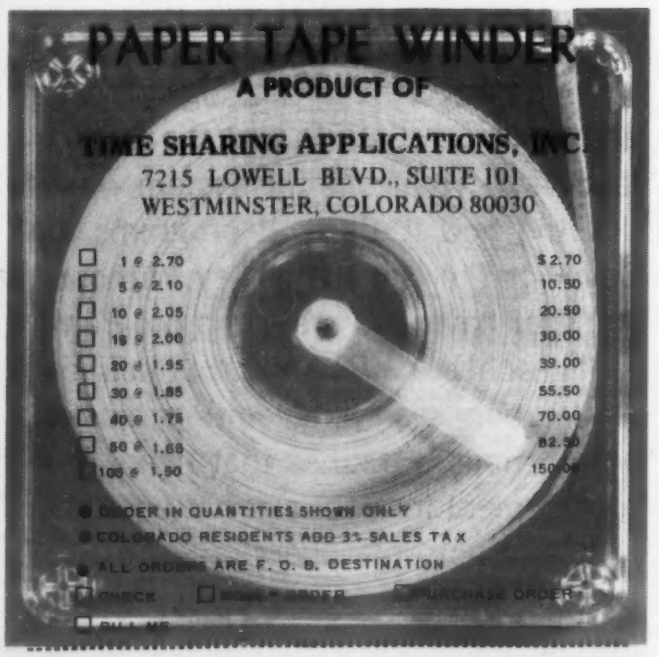
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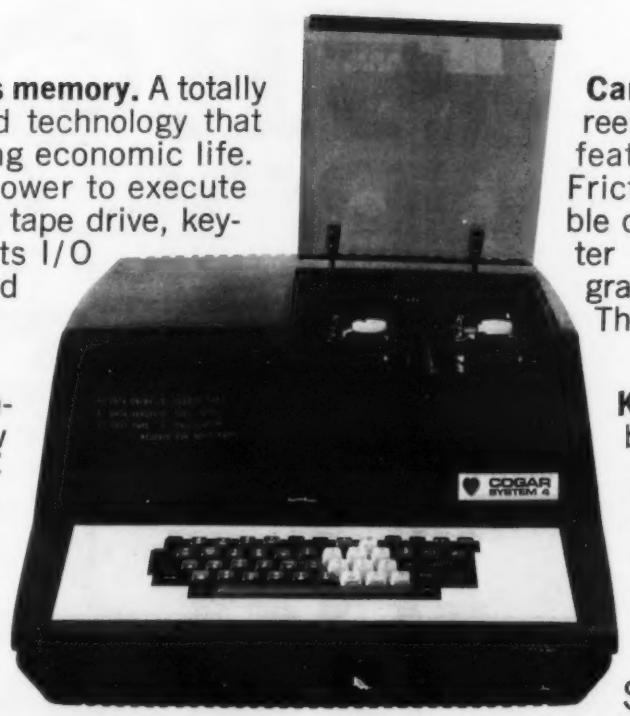
# Cogar announces the mini data processor system.

**Fully programmable random access memory.** A totally monolithic memory. The advanced technology that guarantees system reliability, long economic life. From 2K to 16K bytes. Enough power to execute software control over the system's tape drive, keyboard, visual display. And over its I/O channels. With storage capacity and processor power to spare.




**Cartridge tape system.** An honest reel-to-reel system. With all the proven features of the big tape handlers. Friction capstan, tape guides. Capable of storing a thousand 128-character records on 100 ft. of computer-grade tape. It loads with a cartridge. Threads itself automatically.

**Visual display.** The system can communicate with the operator. Show instructions as they're being entered. Display instructions as they are retrieved. Flash the results of computations and calculations. Give answers to questions.

**Keyboard.** Either a keypunch keyboard. Or a standard typewriter keyboard. For entering data or instructions into the system. For correcting records. Editing programs. Interactive dialogue with the machine.

The Cogar 4 mini processor is just like a big computer system. Designed for word handling as well as numerical computation. With input. Output. Processor and memory. Even hard copy capability.

It has its own programming language. Its own easy-to-use interactive compiler. Its own assembler and editor.

It's built for the countless data management jobs that can't be done economically or conveniently on a big machine. Jobs like programming. Instrumentation control. Component testing. Programmed training and instruction.

It's built to bring the computer to your job. So that you won't have to bring your job to the computer.

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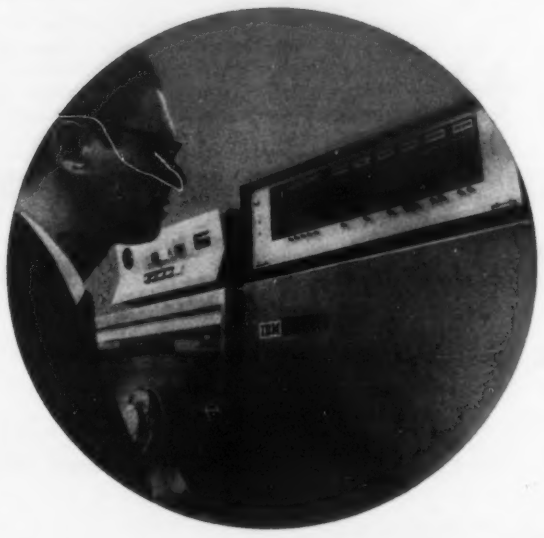
# Keep computing time records accurately, automatically



Increase your computer system's efficiency by plugging a Chrono-log Programmable Clock / Calendar into an existing I/O channel. Then you'll be able to eliminate human effort from computer timekeeping and instead:

- Use the computer to keep accurate, automatic records of computing time
- Sequence jobs on the computer without wasted time or operator intervention
- Bill jobs directly by the computer
- Identify printouts by date and time
- Summarize computing time, non-productive time and downtime

The Chrono-log Clock / Calendar, unlike an internal core clock, *cannot* be stopped or its settings accidentally altered by the operator or by the program. It operates under program control to provide a real-time input of date and time into core storage. And it automaticaly corrects for 28-, 30- and 31-day months and for leap year so that manual resetting is never required.

To learn how you can use your IBM or CDC computer as its own timekeeper, write Chrono-log Corp., 2583 West Chester Pike, Broomall, Pa. 19008 or call (215) 356-6771.

CHRONO-LOG CORPORATION


# Interactive Decision Making Studied

ANN ARBOR, Mich. – The Navy has initiated research to improve the design and performance of man-computer interactive decision systems. The systems are designed to be used as an aid to human judgment, not as a replacement.

The research under way at the University of Michigan under an Office of Naval Research contract, is based on the premise that many decisions should be based on human judgment in two areas – probable occurrence and estimated values.

When an individual receives information related to probable future events, he estimates their occurrence probability, which may influence him to consider certain actions.

His final decision depends on his evaluation of the gains and losses that will result from taking those various actions.

**Man's Judgments Important**

In a man-computer interactive system man contributes certain key judgments about probabilities and values of utilities while the computer can compute and display the implied relative utilities that would result from various actions.

Experimental tasks are being conducted both to study the process of human judgment and how machine computation can be of assistance.

When man estimates a situation, he tends to be imprecise and often reluctant to use numbers, according to Dr. Cameron Peterson, principal investigator for the program at Michigan.

Man tends to be too conservative in updating new information, which results in a poor final decision, Peterson noted.

By using numbers in estimating probabilities, such as a scale of odds, a computer can readily process and update estimates.

In the interactive decision system, man would perform the initial tasks of breaking down into separate components the anticipated value of possible actions and of evaluating each component. A computer could combine and integrate these items.

Using any single criterion desired by man, such as highest overall utility or minimum possible loss, the computer could then display a recommended decision.

Such a system assists human judgment by allowing a man to try out different bases for decision in advance and relying on the computer for rapid assessment of probable outcomes.

It leaves the final decision in the hands of the man who must determine priorities.

# Metal Behavior Simulation Seen Reducing Experimentation Time

MURRAY HILL, N.J. – Scientists at Bell Laboratories have found a way to use a computer to simulate the behavior of metals during the manufacturing process.

As a result, metallurgists and metal producers are now one step closer to being able to predict and control physical and mechanical properties of metals without conducting extensive experiments.

The development of this work dates back to 1938, when a British scientist set up a mathematical model describing what happens to crystals when a metal bar is deformed.

Solving more complex problems, however, required, at the time, solving up to two million sets of five simultaneous equations.

A group at Bell Laboratories recently used linear programming to solve the equations.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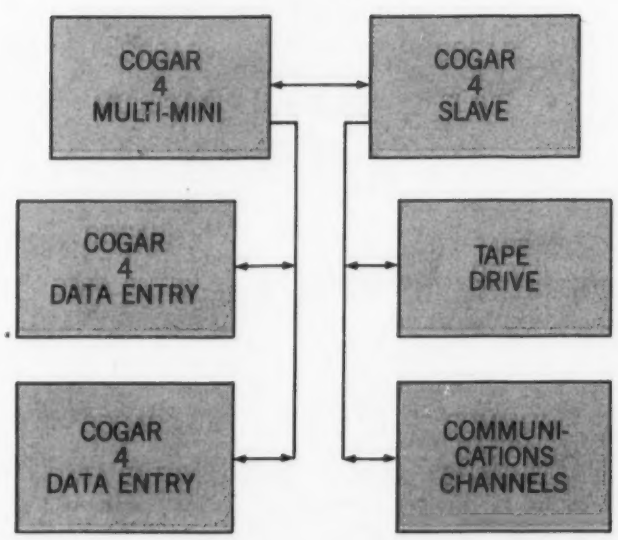
**CAMBRIDGE COMPUTER ASSOCIATES, Inc.**

# Cogar announces the multi-mini processor.




It's a desktop data system. That's smart enough to run another desktop data system. So that they can both work together on the same job. With each of them handling a different part of the job.

The master system, for example, might batch data from a cluster of data-entry stations. Or from remote terminals. While the slave processor controls a disc file. A tape drive. Even a string of communications channels.

What it means is that you can build a complete data management system. Everything between the source document or the business transaction and your main frame equipment. And you can build it step by step. To match the needs of your data handling. To pace the growth of your business.

You can start small. With a multi-mini processor simply collating pages from remote units to computer compatible tape. And you can grow big. To interactive data flow between tape and disc records, remote terminals and your central processor.

The multi-mini. A new idea from Cogar Corporation that puts computer power where you need it. When you need it.

Cogar Corp., Information Systems Div.
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## Dietician Hits Computer Menus

MIAMI – Programmers are not necessarily dietitians, according to Dade County Health Department nutrition expert Mary Ellen Wilcox, who recently joined the U.S. Department of Agriculture in criticizing Hunt-Wesson's computerized menu planning.

Established last August, the homemaking aid offers budget-oriented meals for low-budget families, and nutrition-oriented meals for those willing or able to spend more money, according to Mrs. Wilcox.

Shortages in vitamins A and C were noticed in the low-budget menus, noted Mrs. Wilcox, who also stated that a national survey last year indicated American diets in general are lacking in those same two vitamins.

Shirley O'Neil, manager of the test kitchen for Hunt-Wesson, indicated more meat, fruit, and vegatables were being added to a second set of menus, and that dietitians ran into problems by attempting to work with too many menus.

Miss O'Neil also noted the program was launched with only two weeks' preparation. The second and third series of menus, she said, would be better organized, more nutritious, and would use seasonal foods.

## Voltage Unit Solves Firm's DP Troubles

By Daniel E. Budinger
Special to Computerworld

CHICAGO – A variety of computer malfunctions, ranging from just irritating to very serious, were traced recently to a single cause: off-voltage supply power, but were cleared up by installation of a relatively simple and inexpensive voltage regulator.

An IBM 360/20 would occasionally transfer data erroneously from disk to core. Data read from the disk would be written differently in core than it was recorded on the disk.

When the program checked the data transfer, it sensed the error and would come to a halt. This same type of error would occur when data was being read from core and written onto the disk.

In another example, during an update run on a vendor master file, wrong records were being updated. Because this was a new program, it was at first attributed to a program bug.

Subsequent reruns and tests, however, could not recreate the problem; but it was felt this error, too, was caused by the low-voltage condition.

At other times, the disk drive would go out of operating status, sometimes causing an abort of a run.

Most computer runs were short and it had previously appeared impractical to insert intermediate checkpoints. This meant that a computer "blooper" on the occasional lengthy sort required a complete rerun.

The costs, delays, and perils of such malfunctions include rework time and rental charges for unproductive computer time.

If an entire master file had been lost, the cost of rebuilding the file from scratch, plus the accompanying delay, could have been disastrous.

Using a recording voltmeter, a check of the supply voltage indicated the voltage ranged from well within the computer's tolerance range to below the allowed -10% from nominal.

Subsequent meterings by the computer manufacturer and the electric utility confirmed these readings.

The obvious qualifications for a voltage regulator are that it regulate fast enough within computer tolerance, as well as regulate properly regardless of load level at any given time.

Compactness, ease of installation, reasonable cost, and quick delivery were also considerations.

The regulator selected was a Cemcor III, made by Creiger Electrical Mfg. Co. of Chicago. It met the requirements and also contained its own power transformer. A 240 V three-phase incoming service was stepped down to 120/208 V and regulation to within ±5% was obtained.

The compact unit could be located in a small area on the floor below the computer room.

### Shifts Affect Voltage

It was interesting to note how the firm's own manufacturing operations had been contributing to the low-voltage situation and the attendant problems.

Recording-meter charts clearly revealed a substantial voltage drop as the shop shifts started up – and conversely, a return to normal during lunch hours and when shop machinery was shut down at the end of a shift.

The computer problems disappeared and there has been no single recurrence since the regulator was installed

*Daniel E. Budinger is director of Management Information Services for the Pyle-National Co., Chicago, manufacturers of environmental connectors, and electrical fittings.*

## Hydrologists Model Texas River Basin To Plan Water Use

By Nicolee Ventura
Special to Computerworld

AUSTIN, Texas – Hydrologists at the Texas Water Development Board are using a computer to help them assure Texas of an adequate water supply in the future. To assist the hydrologists in their state water plan, an RCA Spectra 70/45G is programmed with the historic hydrologic data of Texas river basins.

The objective of this Hydrologic Data Refinement Study is to adjust the hydrologic data for Texas rivers back to the "virgin" conditions which existed before man's activity affected the runoff.

This adjustment is accomplished by considering the effects of man's influences on his water supply. Use and return flows from municipalities, industries and irrigation systems, changes in land use management, and diversion of water for recreation purposes, are factors.

Also considered are the effects of creation of farm ponds and reservoirs on the watersheds and changes in ground water additions to streamflow.

Through computer processing of these factors the hydrologists can ascertain the status of water assets for the entire state and can provide more accurate projections of future streamflows.


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## Registry Uncovers Stolen Cadillacs

BOSTON – Using the FBI's National Crime Information Center (NCIC), Massachusetts' Registry of Motor Vehicles has tracked down 23 stolen Cadillacs worth $161,000.

Vehicle ID numbers of 19,000 Cadillacs stolen across the country were compared by the registry's computer with the state's vehicle ID records. Nearly 300 cars with matching IDs turned up.

"Our first target was the long list of stolen Cadillacs," Registrar of Motor Vehicles Richard E. McLaughlin said, "but I intend to continue to conduct an intensive search for all makes of stolen vehicles in the Commonwealth as soon as necessary information is available.

# OCR System Gives Railroad New Data

By William H. Dietz

Special to Computerworld

JAMAICA, N.Y. – Use of an optical scanning system by the Long Island Rail Road (LIRR) permits conductors on commuter trains to provide input to the railroad's computer by merely punching cash fare tickets.

This system has given the line new information on 8% of its business.

Accounting for cash fares sold on-train and accumulating data on 140 LIRR stations is performed by an IBM 1287 optical character reader that accepts holes punched in the tickets, as well as hand-printed and preprinted information. The OCR unit is linked to a 360/40.

The railroad, which carries 260,000 passengers each day, has been able to streamline data collection for a sizable segment of its revenues. The line has established tight controls over tickets issued, while easing the conductor's job.

The railroad believes it was the first to apply an optical scanner to cash fare sales, an integral part of commuter operations. Of the LIRR's 7,000 employees, about 1,000 are conductor/collectors who generate more than 500,000 cash sales aboard the trains every month.

This heavy volume previously was processed manually which incurred high cost, as well as some imprecision in accounting. A mechanized system instituted in 1961 established effective control of printed ticket sales at each station, but it was considered impossible to mechanize on-train sales.

### Sales Data Helpful

These ticket sales reflect marketing data essential to long-range planning. For example, sales volume of individual station booths is reflected. Analysis of such data may indicate which station booths should be open and for how long. Accurate and timely on-train sales data is helping provide this information.

Ticket packs carried by conductor/collectors were redesigned. Each ticket is individually preprinted with a control number, and each book is headed by a control slip printed with a number covering all the tickets in the book. As a conductor begins a new book, he fills in the control slip by hand printing his employee number in a designated space. He also enters an account number which has been issued to him, and serves as a double-check in the system.

If the employee number for some reason is not read or is entered in error, the system will still identify the man through his account number.

The conductor validates the control slip with his punch. Since no two men have the exact same punch, this serves as his signature.

Cover slips are forwarded to the Data Processing Department, where they are fed into the 1287 which reads the preprinted control number, each man's hand-printed identifying numbers, and places this information on magnetic tape.

Later, the tape is used to update a conductor/collector master file of books issued. At all times, there is a computer record of each ticket issued.

The tickets are sold as they always were, with the collector using his punch to indicate origin, destination, direction of travel, the type of ticket sold, and the amount of fare collected.

Since the ticket is a two-part form, a rider's receipt is created automatically. The collector keeps the second half, which is the auditor's coupon. At the end of a run, the collector turns in his coupons, along with the amount collected.

The data read by the 1287 and put on tape is used to perform a number of operations and prepare needed reports. The computer checks the amount collected for each ticket against a table of rates maintained in memory files.

Any errors or exceptions noted by the computer program are printed out so that the conductor/collector who made the error can be notified.

A daily report is prepared providing Passenger Revenue Accounting with a complete rundown on tickets processed the previous day. Every two days, a report showing activity in the conductor/collector master file is prepared. The result is an excellent overview of cash fare activities, providing precise controls and a wealth of statistics not previously available.

On-train fares accounting is the first of a number of applications planned for the 1287. The LIRR will soon begin processing sick leave forms through optical scanning.

Another application under study is an accounts receivable system that will permit commuters to purchase tickets on a revolving basis, similar to public utilities billing.

Thus, a machine originally installed and justified on the basis of one application, on-train fares accounting, is available for additional work, and may provide the key to a system long desired by railroad management.

*William Dietz is director of Management Systems for the Long Island Railroad.*


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## A Computer-Aged Language

HANOVER, Germany – A group of experts here has begun to develop a new writing style, designed for more efficient comprehension by computers.

Computer systems, they said, frequently confuse letters and numerals of the present scripts, such as ones and sevens and the numeral "0" from the letter "o."

The Hanover team is attempting to devise a new style Latin-based script, which would be taught to children in grammar school.

# Varian 620/i Gets Commercial Programming Support

IRVINE, Calif. – Commercial applications become easier to program on card-oriented Varian 620/i minicomputers, with the 620/RPG IV system which combines the automatic record selection and report writing capabilities of RPG with the procedural capabilities of Cobol.

The 620/RPG IV system was developed for Varian by Computer Usage Co., and is based on the Computer Usage Business Oriented Language (Cubol).

The language is compact; source statements are very specific. I/O statements, for example, refer directly to the affected devices. The compiler itself is also compact and will operate in a 3K memory, generating object code in one pass.

The object code is said to take less space than a comparable program written in machine language.

The 620/RPG IV requires no special coding forms, but is completely free-form, CUC said. The language includes normal commercial programming functions including data movement and field comparison, as well as record posting and the accumulation of totals.

The programmer can control the flow of his logic with automatic indicators, conditional execution and branching capabilities. Provisions for entering and leaving subroutines are part of the language, as is simple overlaying which allows each overlay to share common data records with other overlays.

Files may be defined through file definition statements and then automatically opened and closed by the run-time system. Records of various formats may all reside on the same file, and various accessing methods are supported by the system.

Tables under 620/RPG IV are structured into a sequence of identically formatted entries. Entries of a table may be referenced by using a subscript expression.

Sequential tables may be searched through the use of a look-up statement. The statement uses a key in searching for the specific entry.

Report writing capabilities include such basics as page and line control, control break logic and output editing. Redundant lines of title information on a printed line can be automatically suppressed to produce group printing effects.

Arithmetic expressions can be represented in algebra-like statements similar to Fortran. Logical or relational expressions, again similar to Fortran, allow indicators and the results of comparisons to be combined with logical operators.

The 620/RPG IV system includes the compiler, and run-time support that loads each object phase as it is called and causes it to be executed.

Following Varian's normal policy the 620/RPG IV system will be distributed free to all 620 users who have unit record configurations. The system is card oriented, Varian noted, and would be impractical for any installation that did not have a card reader, line printer and punch.

# *Phase-Out of Cobol F Compiler Support Could Hurt Unprepared Installations*

WHITE PLAINS, N.Y. – IBM is planning to drop centralized program support for the Cobol F compiler as of October 31, 1971, and object code library support for programs compiled under Cobol F, a year later.

If a user finds errors in his Cobol F compiler after next October he will have to fix them himself, or have them handled by an IBM field engineer, at hourly rates. Errors found and reported to IBM before October 31 1971, will be processed, with corrections distributed to all users, the company said.

User programs compiled under Cobol F will be modified by IBM without cost if they are made inoperable by new versions of the operating system, until November 1972. After that, IBM will not be responsible for the effect that any operating system changes have on the user's Cobol F programs.

The company announced its plans to withdraw from Cobol F in 1968, at the same time it announced that an ANS Cobol compiler would be available in October 1969. Users who have started to use Cobol F since then, however, have not been formally advised of IBM's plans. Under normal company policy, IBM will send out a notice to all 'users of record' in April, six months before the centralized support is withdrawn.

Pessimists who are aware of the declassifications of Cobol F see severe problems for many installations. Optimists feel that IBM has given them plenty of time and support.

The unhappy users see marked differences between the two Cobols, and a number of flaws that still exist in the ANS compiler. They expect heavy amounts of staff and computer time to be devoted to the conversion, just because of the size of program libraries in many installations.

Other users expect a rather simple conversion period, noting that IBM gave them three years, from first announcement of declassification plans, to make the shift. They note that, not only has IBM provided conversion software, but also included many user suggestions during development of the language conversion programs (LCP).

The optimistic view holds that conversion using the LCPs can be done on a program-by-program basis as recompilations become necessary through normal program maintenance.

# 'Chicago Bug Chaser' Uses CRT Displays To Speed OS/360 Program Cleanup

CHICAGO – Programmers working in a OS/360 environment with CRT terminals can use the Chicago Bug Chaser interactive debugging aid to locate and solve problems in their Cobol programs, according to the developer, Robert M. Hornaday & Associates.

The Chaser provides its messages in Cobol source language, not hex, and this is one reason Hornaday claims that a programmer can debug a complete program in one day, or eight hours at a CRT. Functioning in a multiprogramming mode, the Chaser allows a number of programmers to debug at the same time, and still leaves most of the machine available for production work.

While the programmer is sitting at a CRT, using the Chaser, he can Address Stop the program at a procedural section that he wants to check, or he can let the program execute in a mode that will show him the source Cobol at reading speed as the program runs.

Alternative modes allow him to execute the program one statement at a time or in a single cycle, or to stop the processing to examine the value of data names. He can change the source program and then test the changes.

Otherwise, the programmer can let the program run at normal speed until it hangs. Every time the program being tested ABENDS, the Chaser will display on the CRT the source level statement that caused the error, and it will show the specific error.

Under the Chaser, the test program is not taking machine cycles while the programmer is trying to determine what to do next, and the CPU can be used for any other purpose, Hornaday said.

The Chaser is structured around a series of CRT displays that control and/or report the progress of the test. The basic display outlines the alternative modes available and asks the programmer to choose one. Displays used after that depend on the option chosen, but include one that allows the programmer to define his Address Stop in terms of a program list line number or paragraph name.

The programmer is allowed to define the stop in terms of references to a data name if he is primarily concerned with changes to a particular field.

In Slow Scan mode, the screen is continuously scrolling, or listing the source language statements as they are executed.

The Chicago Bug Chaser is available for $25,000 with an additional charge for custom installation, from Hornaday at 20 North Wacker Drive.

# *CAI Package Index Is Available*

BOSTON – Schools and college administrators can use the second edition of the Index to Computer Assisted Instruction.

The Index is available from Sterling Institute and includes descriptions of 910 programs from 85 sources. This edition, twice the size of the 1968 edition, indicates that CAI package development is accelerating, the editors said.

This point was questioned, however, by a developer who told CW that at least one of his programs is still listed but is no longer available.

The programs are listed by subject so that the reader can get an overview of material in his area, as well as detailed information about specific programs.

Each abstract shows not only program name, author, source, but a description of the program's purpose, the expected prerequisites and the level of instruction it is intended to supplement.

Each abstract also shows the language in which the program is written, the central processor on which it has been implemented, and the terminals that can be used with it.

The Index costs $19.50 and is available from Sterling Institute at 3750 Prudential Tower.

## *Comserv T/S Offers Financial Services*

PHILADELPHIA – Accounting and financial personnel in the Middle-Atlantic states can now use two services available on a time-sharing basis from Comserv.

A general business and finance library, developed by Western Data Science, Inc., includes programs for general ledger accounting, cash investment analysis and depreciation analysis.

Proforma is a business planning and report generating system designed for use by non-programmers.

Available in either interactive time-sharing or remote batch mode, the business library gives the user the option of hard-copy or CRT read-out. Comserv spokesmen noted that the cash investment and depreciation analysis portions of the library could be used in near-simulation mode with CRT output.

Comserv has a computer center in Philadelphia and is planning the installation of message multiplexers to service the northern New Jersey and metropolitan New York City areas. The firm is at 4025 Chestnut St.

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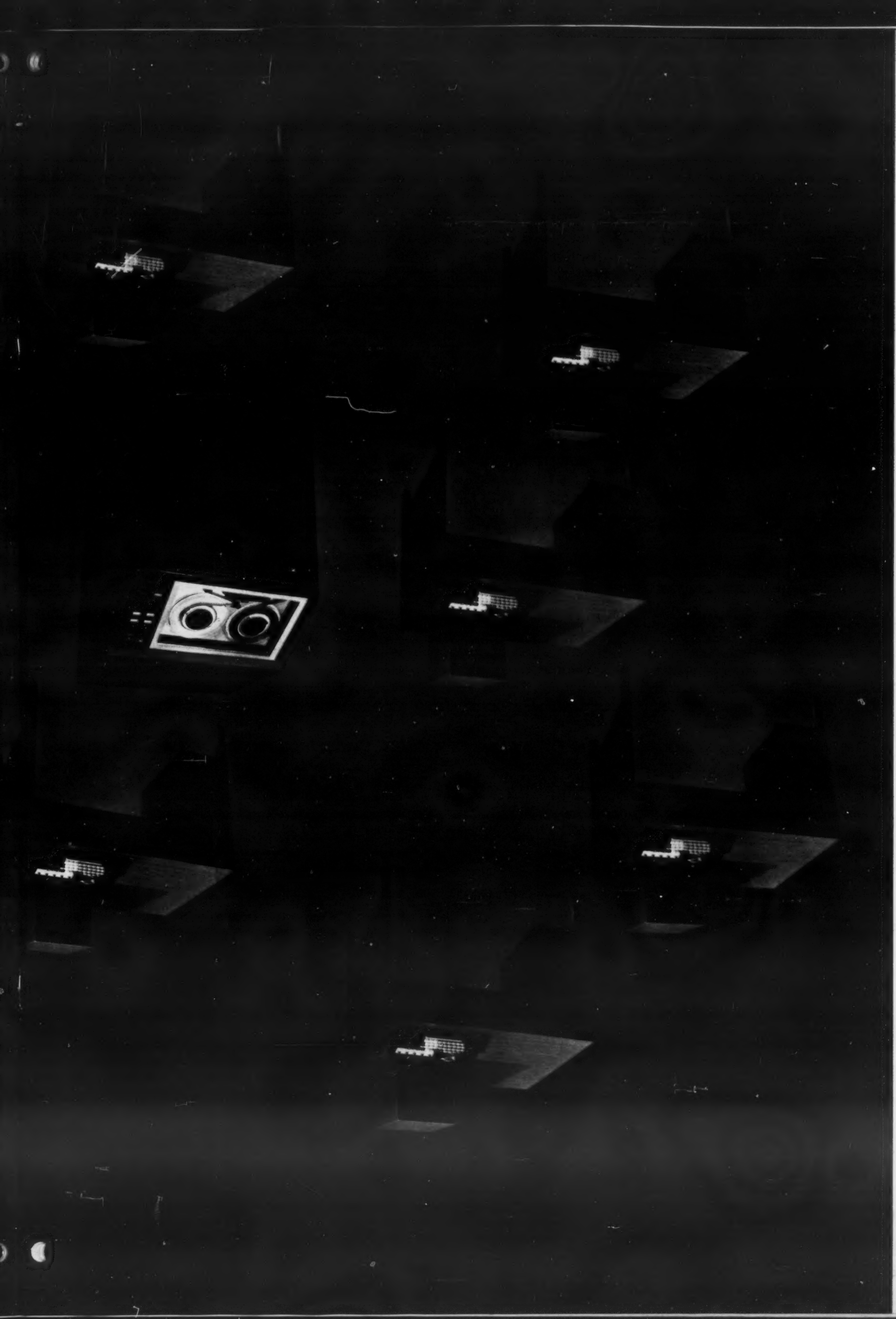

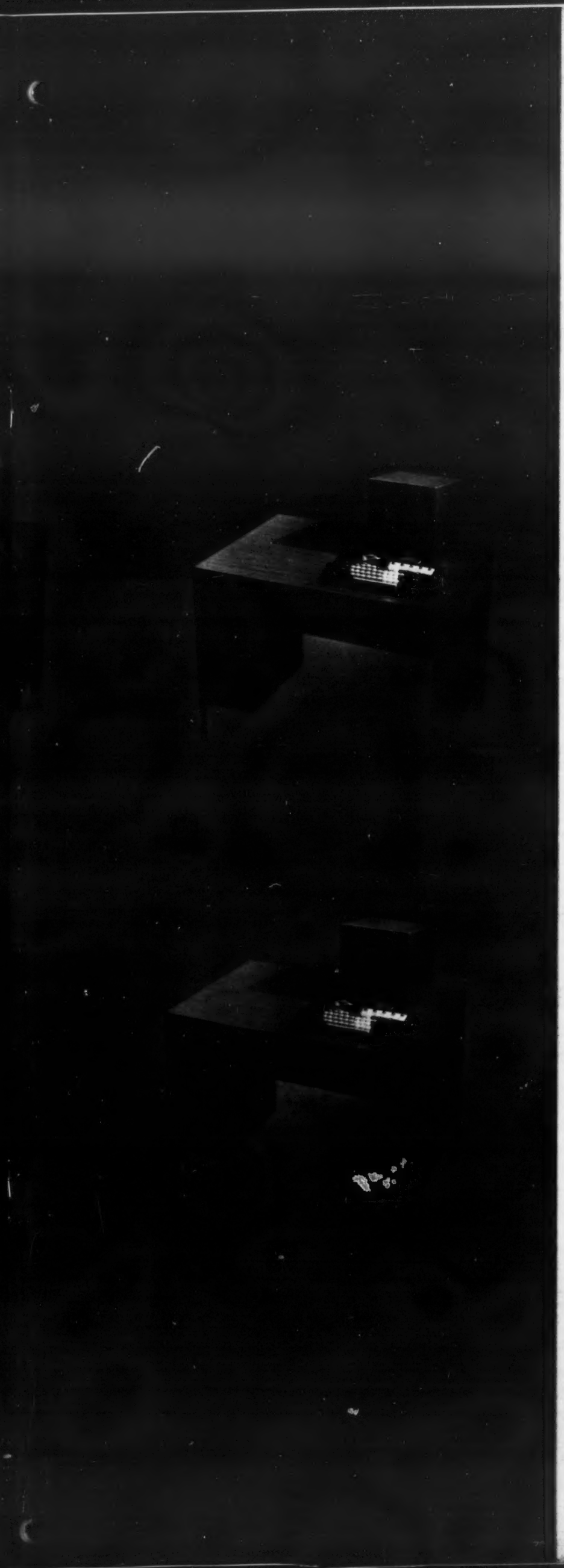

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INFOREX

# IBM's 'Cogs' Forecasts Consumer Product Sales

By Don Leavitt
CW Staff Writer

WHITE PLAINS, N.Y. – The IBM Consumer Goods System (Cogs) is a set of program products being developed to provide users with data to make consumer goods production and distribution decisions. The first two parts of the system, Cogs-Forecasting and Cogs-Allocation, are available now, according to IBM.

Cogs-Forecasting projects sales performance into the future. It is said to give the user the ability to choose the most appropriate forecast model, and the facilities to monitor and update the model according to changing market conditions.

Cogs-Allocation uses advanced mathematical and statistical methods to determine when and how much of a product is to be made and shipped to various stocking points. A built-in simulation capability enables the user to preview the effects of various policy alternatives.

Cogs-Forecasting also provides simulation capability so that the user can predict the accuracy of a given forecast model, based on user-provided product sales history. In addition, trends and seasonal factors can be recognized if at least two years' prior history on a product is available, IBM said.

To utilize the Cogs-Forecasting simulation, a portion of a product's sales history is model-fitted, while another portion is simulated on a period-by-period basis. By varying forecast stability/responsiveness parameters, the user is able to simulate several models to determine which is best suited for the product.

As current sales data is accumulated and processed against the system, the program measures forecast bias. If this bias exceeds a user-specified percentage, Cogs prints an error message on the console typewriter to alert the user.

Input requirements for Cogs-Allocation include Cogs-Forecasting output or a similar forecast of product sales demand by period plus a measurement of forecast error.

The user must also supply the inventory status of the product at the various storage locations, and the lead time required between the decision to ship and the arrival of the product at the warehouse.

Both of the Cogs packages are written in PL/1 and are available for IBM 360/30 or larger models with 65K storage, under DOS. Versions for OS/360 using 128K on 360/40s or larger, are expected to be available this month. DOS and OS versions for the 370 will also be available, IBM said.

The DOS Cogs-Forecasting costs $200/mo while the Cogs-Allocation costs $150/mo, each under license agreement.

# DEC Newspaper Package Simplifies Input for Classified Ad Typesetting

MAYNARD, Mass. – A DEC software package for compiling newspaper classified advertisements, said to require fewer keystrokes for operation than comparable packages, is available for the Typeset-8 small computer-based typesetting system. Classified Ad Storage II includes an alphanumeric sorting capability, automatic advertisement deletions and skip processing capacity, the company said.

The package accepts paper tape output from a DEC Typeset-8 hyphenation and justification program, sorts and orders the advertisements by classification, and stores them on magnetic tape for use by typesetting machines.

Classified Ad Storage II sorts and places each advertisement in proper sequence at the same time it is stored on magnetic tape.

The automatic kill feature permits advertisements stored on tape to be run as desired by the operator. During the "update run" phase of classified advertisement, maintenance kills are made. The skip advertisement feature insures that ads slated for publication do not appear on an unspecified day. Price of the package is $1,500.

# 'Orbit II' Aids Data Retrievals Under OS

SANTA MONICA, Calif. – Orbit II, an interactive general-purpose information retrieval system, from System Development Corp. (SDC), allows non-programmers to search and perform complex retrievals, using a few English language commands, with typical response times said to be a few seconds.

Orbit II operates under OS on 360/40 or larger with 256K-core. It can be used in a dedicated mode or on a time-sharing basis serving up to 150 on-line users, according to SDC.

Sale price is $22,000 including delivery, installation, training, user manuals, and one year's maintenance. Leases are also available, from SDC at 2500 Colorado Ave.

# Sci-Tek Has Programs For Stocks, and CEs

WILMINGTON, Del. – A service has been developed by Sci-Tek to minimize or halt transactions in missing investment securities. The firm also has a version of IBM's Integrated Civil Engineering System (Ices) that has been implemented on the Univac 1100 series.

The company said that the Securities Validation System (SVS) is an on-line inquiry system that will allow members of the New York and American Stock Exchanges, and banks to validate securities offered for sale before funds are disbursed.

The conversions of the Ices system covers both the executive system and the applications subsystems, Sci-Tek said. It is specifically designed to parallel the IBM 360 version in terms of capabilities and to exceed it in terms of efficiency, the company added.

The SVS is expected to undergo a 90-day trial period with selected members of the New York and American Stock Exchanges in the near future.

Sci-Tek is at 1707 Gilpin Ave.


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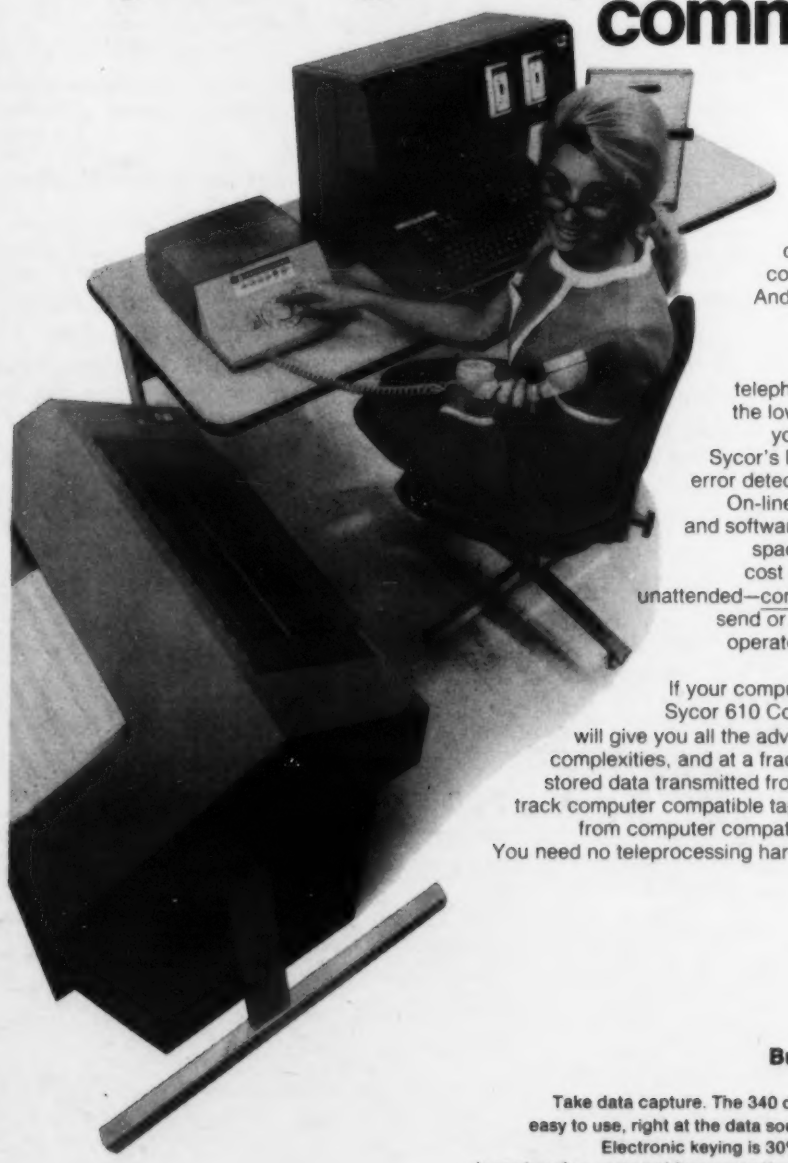

Focal point of the Sycor system is the powerful, versatile 340 stand alone video terminal. On line to your computer, or point-to-point between terminals, you can count on it for fast, accurate communications. And chances are it'll save you money. Because it's crammed with every feature we could think of to cut communication costs.

For instance, you can use low cost public telephone lines. And because the faster you send the lower the cost, you can choose speeds to suit your traffic load—1200, 2000 and 2400 baud. Sycor's binary synchronous procedures provide line error detection and efficient automatic retransmission. On-line they're compatible with IBM 360 hardware and software. The data compression feature eliminates space characters from transmission, so you cut cost by reducing transmission time. And, there's unattended—completely unattended—operation; so you can send or receive data anytime without the cost of an operator standing by. You can send, process, and transmit back, all overnight.

If your computer's software is batch-oriented, an off-line Sycor 610 Communications Station at your central office will give you all the advantages of teleprocessing, with none of the complexities, and at a fraction of the cost. The 610 receives cassette stored data transmitted from the 340 terminal and records it on 7 or 9 track computer compatible tape, ready for your processing. It also sends from computer compatible tape back to cassettes on the terminal. You need no teleprocessing hardware or software, and, of course, you can utilize low cost unattended operation.

**But batch communications is only part of what you really want, isn't it?**

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SYCOR INC

# User Has to Consider Tradeoffs With 129 Keypunch

By Frank Piasta
CW Staff Writer

Although key-to-tape and key-to-disk systems usually offer performance improvements to the keypunch installation, an effective alternative may be an upgrading to the devices which combine keypunching and verifying capabilities.

With the availability of the IBM 129 verifying keypunch, the user will probably consider converting at least part of his current battery of separate keypunches and verifiers to this type of unit. Although his first reaction to the new device may be negative, a low-cost adapter may provide the solution.

The cost of the 129 printing verifier/punch, Model 3, is only $24/mo less than the cost of a separate printing 029 and 059 combination, which seems to provide almost twice the throughput by keeping two operators busy at the same time.

This would be great if it worked, but workloads would have to be ideally balanced between punching and verifying at all times, and this is seldom the case.

In the typical installation, work seems to come in cycles, with a heavy punching load followed by overlapped verifying. With the ability to change the function of a unit from punching to verification, fewer units could handle peak loads. More important, the number of operators that are idle is diminished.

Consider the problem of verifying. With separate units, the verifying operator puts to one side all of the cards in which she has found errors to be corrected on a keypunch when she gets to the end of her batch.

To avoid a delay while the operator waits, a punch dedicated to corrections could be provided.

But if the dual-purpose machine were used, the verifying operator could immediately make the corrections at her machine. This would also eliminate another source of potential problems, the filing of corrected cards into the wrong job.

Based on the above, it seems quite logical to expect some installations to convert at least part of their verifiers to the dual-purpose units then would ate some of their punches.

Another reason for converting to the new device lies in punching speed. The punching operation takes a shorter time if fewer cards have to be repunched due to errors. Buffered machines such as the 129 allow a percentage of keying errors to be caught and corrected by the punching operator before data gets onto a card. The buffered, dual-purpose units then would seem to deserve a definite place in the user installation, even at a higher machine cost.

This cost, however, can be reduced if the dual units are obtained from Univac.

Besides a price difference of $23/mo, the Univac 1701 claims faster speeds than the IBM 129. Punch rate, for example, on the 1701 is 47 col/sec as opposed to 18 col/sec for the 129.

Speed is also increased due to features such as an auxiliary input which can eliminate manual card handling, a stacker select that allows mispunched cards to be separated, and a movable keyboard to adapt the machine to the operator's requirements. Univac claims that its unit is 200% faster than the 129.

The Univac 1710 carries a price tag of $5/mo more than the IBM 129 printing model, but it has the added capability to accept pre-punched cards and interpret them.

Another cost figure might be of interest to the multiple-shift installation. Whereas the IBM device costs the user 50% of the base monthly rental for each shift of overtime operation, Univac does not charge for overtime.

The IBM 129, however does offer features that the Univac units lack. Six format programs stored instead of two will increase the flexibility of an IBM keypunch/verifier station. The availability of accumulators helps in catching errors before they get to the computer, and a keystroke counter helps to cost out individual jobs.

An alternative to the purchase of a keypunch/verifier unit could be the installation of a verifier adapter from Western Union Computer Utilities (WUCU), Ft. Lauderdale, Fla., that adds the capabilities of an 059 to any 029 punch.

Priced at $44.50/mo with auto-dup, the WUCU unit, called the IDT, allows the user to adapt his purchased or leased 029s without affecting the IBM service, according to the manufacturer. Purchase price is $1,675.

The device is installed at the user's site in about two hours by Cybertronics, which handles WUCU's maintenance.

# Computer-Compatible Tape Records Data Received by Off-Line Tally Terminal

KENT, Wash. – A buffered off-line communications terminal from the Tally Corp. records incoming data onto half-inch computer-compatible tape.

Called the T-1800, the unit operates over standard grade lines for use as a high-speed batch receiver and transmitter handling multiple remote reporting stations.

Advanced error control is achieved through the combined use of character parity, longitudinal redundancy, binary summation and record numbering, according to the company.

The T-1800 is centered around a communications control unit which includes error control, transmission electronics, modem, and line discipline logic. Transmission speeds of 1,800, 1,200, or 600 bit/sec are available. Punched paper tape can also be used instead of magnetic tape.

The terminal is intended for use in batch data transmission in those areas of industry concerned with the distribution of goods

The T-1800 is available currently at a price of $700/mo or a purchase price of $13,750.

The Tally Corp. is at 8301 S. 180th St.

# Unit Spots Disk, Drum Head Crashes

BALTIMORE – A low-priced device that can be used by any disk or drum user to detect impending head crashes up to 24 hours before they occur has been developed by Air Techniques, Inc.

Called the ATI Anti Head Crash System, it is sensitive to foreign particles entering the unit down to 0.3 microns in size.

As with a similar device from Royco Instruments Inc., Menlo Park, Calif., crash is forecast by a buildup of particles in the disk or drum enclosure.

The unit works on a "forward light scattering" principle, with particles drawn into a light beam, which is then reflected off the particles to a light-sensitive cell. The user can pre-set the particle level at which a crash alarm will be triggered.

### System Adaptable

The system is mounted directly on top of the drive, and can adapt to any disk or drum. The only connection is a sampling tube that must be placed near the read/write heads, the firm said. Models are available to monitor from one to four drives.

Prices of the Anti Head Crash System range from $980 to $1,600, with initial deliveries scheduled for the first quarter of this year.

Air Techniques, Inc. is at 1717 Whitehead Rd.

# Drafting System Based on 1130 Produces Plots, Master Artwork

SOUTH WINDSOR, Conn. – The System 11 drafting system improves line quality and increases throughput of digital plotting on-line to an IBM 1130, according to Gerber Scientific Instrument Co.

The system is intended to be used with an 8K 1130 equipped with a Storage Access Channel (SAC), and is supported by a software package that can produce data plots, drawings, and master artwork. The computer is used to perform such tasks as linear interpolation, dynamic look-ahead, control of velocity and acceleration of plotter motion.

Five different flat-bed drafting tables may be used, ranging up to 24 ft in length with plotter resolution from .001 to .0001 in.

Input to the user's program from any 1130 peripheral is converted to absolute floating point and then is transferred to the plotting package.

The system is provided with a double buffer, allowing for an input/output overlap. During the time that one buffer is used for outputting data to the plotter, the other buffer is being loaded by input data.

Although the system is best utilized by the transfer of batched data, Gerber said, a software option is available to provide compatibility with present linkages to IBM plotter routines.

Additional plotting features include variable scale factor, floating zero origin, and tool or pen select and control. The standard resolution of 600 IPM can be altered by changing drive gears and making minor alterations to the software.

System 11 prices begin at $30,000, with delivery in 90 days, from 83 Gerber Rd.

# Cassettes Collect Data

OCEANPORT, N.J. – The Interdata minicomputer cassette system is intended for use in applications where medium speed I/O and large storage capacity is important in data collection.

Interdata's Data Collection System

The system, consisting of an Interdata Model One computer and the company's Intertape cassette system, includes a dual tape transport using standard Phillips-type cassettes, power supply, and a device controller.

Each cassette has a capacity of over 250K bytes. The read/write transfer rate is 300 char/sec (three in./sec) and the transport has a fast forward/reverse/rewind capability at 90 in./sec. The recording is dual track NRZ.

The system sells for $6,750, from 2 Crescent Place.

All Novar terminals are equipped with built-in modems that offer the best signal-to-noise ratios available — reducing to a minimum errors introduced by noisy phone lines. One of many Novar features that assure data accuracy.

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# Interactive Tenet 210 Has Million Bytes of Storage

By Frank Piasta
CW Staff Writer

SUNNYVALE, Calif. – The Tenet 210 is a medium-scale, interactive computer with as many as 128 simultaneous users on-line. It can include up to four processors, a million byte core memory, and a billion bytes of disk storage.

In keeping with its time-sharing orientation, the 210 offers such interactive languages as Fortran IV-H, and Basic, in addition to a meta-assembler. The 210 is designed as an alternative to the XDS Sigma 7 and 9, according to Tenet.

The processor uses a 32-bit word and offers field and bit capability.

Eight high-speed registers, of which seven are available for indexing, are built in. Indirect addressing with pre-indexing or post-indexing can be used. A set of 208 instructions includes a "programmable instruction" that generates linkage to user-defined macros.

The processors are connected to a data exchange that has twenty bidirectional direct memory access channels with access priority. Twenty levels of nested interrupts are offered, with each level expandable to 16 sub-levels. As many as eight memory modules can be interfaced.

Core memory is expandable from 8K to 128K words (512K bytes) per module. The memory cycle time is 800 nsec, and up to four-way interleaving is optional.

The first communications controller to be offered with the system supports only Model 33 Teletypes or equivalent units. Options include direct wire connection or access via the dial-up telephone network. Each controller supports 16 full-duplex channels.

**Peripherals**

Disk pack drives of the 2314 type, supplied by ISS, Memorex, or Century Data, can be connected to the I/O Processor (IOP), which can handle four drives. Byte transfer rate is 312K byte/sec. As many as four IBM-compatible tape drives can also be attached to an IOP.

Other peripherals include 400 and 1,000 line/min printers, card reader and punch.

A typical 32-terminal system, that includes one processor, 32K words of core, two disk IOPs with one drive each, one tape IOP with one drive, and two communications processors, carries a lease price of $9,400/mo, and sells for $376,500.

Tenet expects to ship its first systems during the summer of 1972, from 927 Thompson Place.

# Four PDP-12 Systems Allow User Growth

MAYNARD, Mass. – Four systems for the DEC PDP-12 are said to give users more hardware and software for the price than they would get if they purchased the components separately.

The PDP-12/10, priced at $15,900, is designed for users who want a simple system that can be easily expanded. The PDP-12/10 includes 4,096 words of core memory, a 16-channel analog-to-digital converter, an ASR-33 Teletype, six sense switches, and 12 sense line inputs. A version of DEC's Focal language for operating system components is provided. The PDP-12/10 can be used to do real-time computer programming.

The PDP-12/20 is an up-to-date version of DEC's Laboratory Instrument Computer System, (LINC). It includes all the features in the PDP-12/10, as well as two magnetic LINCtape storage units, a CRT display, automatic priority interrupt, and a display-based operating system with application software. It is priced at $29,000.

The PDP-12/30 includes the components offered with the PDP-12/20 plus an additional 4K of core memory and a real-time clock, and such software as Catacal, Life, Dial-MS, and Focal-12. It costs $35,900 or $5,000 less than the components would cost if purchased separately.

The PDP-12/40, priced at $42,900 adds the Floating Point Processor (FPP-12) to the PDP-12/30 and is priced at $7,900 under the cost of the components, DEC said.

# L-2400 Can Swap With Bell Units

HOUSTON – Computer Complex, Inc. has extended its modem line with a 2400 bits per second data set, the L-2400, which features a cards-only design and direct interchangeability with the Bell System 201B series modems.

The synchronous modem may be internally or externally timed, and sells for $1,495, from 6400 Westpark.

HOW do things look for the computer industry as the pause in growth apparently is ending?

The current "Gray Sheet" -- a Midyear Review -- examines the status of each major mainframe supplier and all industry segments. Send for the current issue -- $8. Or, go ahead. A year's supply only costs $75.

EDP industry report

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Is there another comp center on campus competing with yours?

University comp centers offer batch processing. It's traditional. In fact, when computers were all that expensive, it even made sense. Batch, after all, keeps the machine efficient.

But times change. Now, computer users worry more and more about keeping *themselves* efficient. When they have an idea, they don't like to wait a week to find out if it's any good.

That's where the PDP-10 computer comes in. Through interactive timesharing, faculty and students can check out their ideas right then and there – in scientific, business, or problem-solving computer languages. Many users simultaneously. All without bothering the batch operations one little bit.

As a matter of fact, we know of several departments that have their own PDP-10 (and service other departments with it on the side). That's why, increasingly, university comp centers are moving to cut down on local competition like this (and on outside timesharing services, too). After all, a PDP-10 in the comp center can just as well serve the whole campus – – business offices included.

It's worth a few calls. First to find out if you have any competition on your campus. And then to us, to make sure the competition doesn't develop.

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# AT&T Reduces DAA Time Delay to Aid Data Users

By Ronald A. Frank
CW Technical News Editor

NEW YORK – A built-in time delay in Bell's automatic Data Access Arrangement (DAA) devices has been reduced by AT&T in a move apparently aimed at eliminating problems of certain computer data users.

According to Bell specs issued in August 1970, the delay time had been two to five seconds. The recent time reduction described by an AT&T spokesman as a "class A change," cut the delay to one to three seconds, apparently in response to problems being encountered by users.

According to Bell System technical references, the time delay in the AT&T CBS and CBT DAA devices is necessary to properly record billing information at phone company central offices. In addition, the interval protects necessary network signalling functions on the phone network.

Most affected by the time delay are DAA users who regularly poll a number of remote sites equipped with automatic-answer capabilities.

The delay works like this: When a remote site is called from a central computer, the automatic-answer data set (a non-Bell type with a DAA) is prevented from batch transmitting its data until the delay in the DAA device is finished.

Although seemingly minor, a delay of several seconds, during which the CPU is waiting and the remote site cannot transmit, is important to high-volume data users who regularly poll a large number of remote sites. In addition to delaying transmission, the interval can tie up valuable CPU time.

One DAA user told CW that his CBS unit had a delay time of seven seconds. After calling his local phone company, Bell representatives modified the unit to bring it within the specified interval.

Although most observers feel that the delay is necessary for Bell to accurately bill users, and insure proper network operation, an added delay in DAA devices operating with non-Bell modems could give users of such data equipment a disadvantage compared to Bell data sets.

But, an AT&T spokesman told CW that all Bell units had similar delay periods built-in. He added that the original longer time interval had also affected some AT&T data set models that were not able to complete the "handshaking" identification which normally preceeds data transmission.

Although he did not identify the specific models, some data sets apparently completed their portion of the handshake so fast that they disconnected before the end of the time delay.

In a related move, Bell has redesigned the DAA line to a new 1000 series. The manual DAA has been changed from CDT to 1000A; the EIA-compatible automatic DAA from CBS to 1001A; and the automatic relay-type DAA from CBT to 1001B.

## FCC Plans More Carrier Hearings On January 21

By Alan Drattell
CW Washington Bureau

WASHINGTON, D.C. – Oral arguments regarding microwave applications for specialized common carriers have been scheduled for Jan. 21 by the FCC.

The commission will hear arguments on whether it is in the public interest to permit new carriers to enter the specialized communications field; whether comparative hearings are necessary; and what is the appropriate means for local distribution of the proposed services.

The oral arguments are expected to clarify the more than 100 written comments submitted earlier by data users in response to Docket 18920, the commission said. Spokesmen will be able to summarize their views, and the commissioners will be able to ask questions directly, without the usual machinery of formal submissions

The FCC added that the oral presentations would not delay a resolution of the proceedings, which is expected next spring.

The FCC has asked for a discussion of the Microwave Communications of America plan to allocate frequencies in the 38.6 to 40 GHz spectrum for common carrier local distribution service.

## ICC Expands User Services

MIAMI – International Communications Corp. (ICC) said that it can now provide users of its modems with overall diagnostic services for entire data communications systems.

According to the company, the customer support eliminates the need to call in trouble-shooters from various equipment suppliers, in order to pinpoint the source of system problems.

There is no charge for the service if the problem is found to be in an ICC modem. If the problem is elsewhere, the user will be billed $23/hr, ICC said. The firm is at 7620 N.W. 36th Ave.

# Hardwire or Variable Microcode: Users Must Choose

By Peter L. Briggs
Special to Computerworld

Users face a growing dichotomy in the choice between minicomputers based on hard-wired logic and those offering variable microprogramming. In selecting a system, alternatives for the user are ease of use and limited capability, or flexibility requiring sophisticated programming.

The concept of a hard-wired system, as most minicomputers seem to be used, implies that a machine does basically one thing most of the time. Many mini users, however, need the capability to perform more than one job, but do not require a general purpose computer.

Hard-wired logic machines contain the capability to perform those functions that most likely fill the user's requirements. A basic instruction set and a certain amount of special instructions, usually designed into the machine at the user's request, come with many hard-wired machines.

These special instructions might handle communications lines or might be designed to do specialized table searching.

With variable microprogramming, a basic package of instructions might be available. These instructions are loaded through the software.

If the user needs additional instructions, or wishes to change instructions, he writes up the logic of the desired instructions and loads them either with, or as a replacement for, the "standard" instructions.

Thus his dedicated machine becomes a poly-dedicated machine, readily capable of handling a group of dedicated applications with special requirements.

An 8K-core memory minicomputer with variable micrologic may be purchased for about $10,000 to $12,000, perhaps slightly higher than hard-wired machines. It does nothing to solve the cost problems for peripherals, but it does facilitate the use of peripherals when they are attached.

If a device requires some specific instructions in the interface, then the microprogramming could be altered by the user to accept the new device. To handle a specific type of indexed file, the user could develop instructions that combined the I/O logic and the search algorithm, and execute the entire search as a single instruction.

### Microprogramming Problems

There are problems for both the user and the manufacturer when using variable microprogramming. The most noticeable occurs when a user alters the algorithm for a standard instruction. If the software depends on an instruction, it is very dangerous to play around with that instruction.

This problem is just as real for general-purpose computers as for minicomputers.

Adding new instructions presents no maintenance problem, because the systems software, unless the user alters it, will only be based on standard instructions.

The proper design and testing of instructions does require some fairly technical work. A systems programmer would need several months of training to become familiar with the microinstruction set of a new machine. This training time would cause a delay in implementation, and might well raise the price of that systems programmer on the job market.

### Manufacturer Responsible

Hard-wired machines, on the other hand, are completely set up by the manufacturer. The manufacturer assumes responsibility for the proper working of the instructions, and maintenance in case of machine failure.

The cost of using a hard-wired machine becomes higher than the cost of one with variable instructions if the user requires more instructions than can be easily added to the basic processor.

Most of the small processors only have a certain amount of additional space for extra instructions. A user wishing to expand or change his application after delivery may pay a high price.

Long-range flexibility, the option allowing for changes in the user's needs after he has installed the machine, should be seriously considered when preparing a hard-wired system.

Though there are slight cost advantages to having hard-wired machines, and there are fewer potentials for errors in programming and design, variable micrologic means that the user will probably save money and time over any extended period. He is not locked into a particular configuration or concept.

*Peter Briggs is an independent consultant specializing in data processing.*


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### Actor Gets Break

HONOLULU – Movie actor James MacArthur has reason to like computers. In a prescreening of a series in New York, the test audience indicated its favorable and unfavorable reactions to the movie by turning dials.

The results, compiled by computer, indicated the unpopularity of the actor portraying Danny Williams in "Hawaii Five-0." The executive producer replaced this actor with MacArthur.

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GENERAL ELECTRIC

## Undergraduate DP Curricula Dartmouth Conference Topic

HANOVER, N.H. – A grant of $50,500 has been awarded by the National Science Foundation to Dartmouth College for a Conference on Computers in the Undergraduate Curricula to be held here June 23-25.

As part of the conference Dartmouth has issued a call for papers on how computers are being used in undergraduate education.

The school said investigators may submit papers by February about their experiences with computers in teaching such subjects as biology, home economics, history, and languages.

The conference has as its purpose the dissemination of actual experience and plans in the use of computers in undergraduate instruction. Refereed submitted papers will comprise the bulk of the parallel session conference, with invited papers, panel discussions, and demonstrations rounding out the meeting.

The scope of the conference will be national and content will be broad enough to encompass most academic fields at the two and four-year colleges as well as the undergraduate schools of the universities.

Papers may be mailed to Dr. Fred W. Wingarten, Director, Computer Services, Claremont Colleges, Claremont, Calif. 91711.

## Medical Seminars Set

WASHINGTON, D.C. – A series of three-day hospital and medical seminars will be held at The George Washington University Medical Center during the first six months of 1971.

The "Hospital and Medical Information Systems" seminars, scheduled for Jan. 25-26, Feb. 22-24, March 29-31, April 19-21, May 24-26 and June 28-30, are sponsored by Control Data Corp.'s Institute for Advanced Technology.

Designed for hospital administrators, DP managers, and medical personnel, the seminars include discussion of the nature of computers and their applications in multiphasic testing, medical information retrieval, and coronary and intensive care monitoring.

Further information and seminar registration forms may be obtained from Registrar, The Institute for Advanced Technology, Control Data Corp., 5272 River Road, Washington, D.C., 20016.

## Cuyahoga College Computer Studies Student Tests, Helps Teach Reading

CLEVELAND – There is a computer helping teach reading and language skills at Cuyahoga Community College.

At the beginning of the fall term some 1,700 students took reading and writing tests. The results of these tests were entered into the computer, which analyzed each student's strengths and weaknesses, and created a file on each student.

During the year instructors have added results of tests, writing samples, and other data into the student files. The information is available to the students and the instructors to construct an individualized teaching program.

"Students seem to like the idea," one instructor said. "The results are something tangible they can work from."

## Call for Papers

1971 FALL JOINT COMPUTER CONFERENCE, Nov. 15-18, Las Vegas. The theme of the conference is "Computers and the Quality of Life." Papers are invited dealing with urban planning, environmental control, education of the disadvantaged, planning for change in highly industrialized nations, and acceleration of the progress of emerging nations, as well as with system design and hardware/software technology.

Six copies of the papers, including a 100 to 200 word abstract and a draft not exceeding 6,000 words, should be sent to: Dr. Martin Y. Silberberg, Technical Program Chairman, 1971 Fall Joint Computer Conference, P.O. Box 11337, Palo Alto, Calif. 94306

FIFTH ANNUAL IEEE COMPUTER CONFERENCE, Sept. 22-24, Boston, Mass. Focus of the conference will be "Hardware, Software, and Firmware Tradeoffs." Papers should revolve around the topic, and the emerging use of system methodology for resolving design questions.

A written digest of less than 1,600 words and major illustrations summarizing the proposed paper are to be submitted by April 30. Papers chosen for presentation will be published in digest form only. A copy of the digest should be sent to: 1971 IEEE Computer Conference, P.O. Box 245, Prudential Station, Boston, Mass. 02199.

## Digitronics Users Elect Officers

LONG ISLAND, N.Y. – John DeLuca of First National Stores was elected president of the Digitronics Users Association (DUA) at its fifth annual conference.

Also elected for 1971-72 were: John Newe of E.F. Hutton & Co., vice-president; Joe Mayfield of Michigan Credit Union League, treasurer; and Mort Siegelbaum of Digitronics, secretary.

# Grant to MIT Aids Experimental Plan For Technical Library System Support

CAMBRIDGE, Mass. – The Council on Library Resources has made a $400,000 grant to the Massachusetts Institute of Technology to support for one year the experimental operation of a computer-based technical library system that could be a prototype for future libraries.

The information transfer experiments (Intrex) system, which users can operate from remote CRT consoles, contains a continually growing literature base of detailed catalog data and microfilm texts. More than 12,000 recent articles in the fields of materials science and engineering comprise the data base, which is being increased at the rate of 400 new articles a month.

The grant is to support on-line experiments that permit engineering and science faculty and students to use the service for their own library work.

A central time-shared IBM 7094 serves remote I/O consoles simultaneously. The computer is a part of MIT's Information Processing Service and a significant portion of its capacity is made available for Intrex experiments.

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## *Our February 24th Inputs Supplement*

will feature:

- Which user sites can make best use of various keyboard input systems?
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- What are the future trends in remote batch?
- Keypunches – new life in an old medium.

Our *Independent Peripherals Inputs Supplement* closes Feb. 5. Reserve your advertising space by filling out the coupon below, or contact your local Computerworld representative.

## *Our March 31st Memories Supplement*

will feature:

- Which user sites can make best use of bulk memories?
- Can independent suppliers continue to provide savings to computer users?
- The trend to disks.
- What can independents offer besides lower prices?

Our *Independent Peripherals Memories Supplement* closes March 12. Reserve your advertising space by filling out the coupon below, or contact your local Computerworld representative.

## *Our April 28th Outputs Supplement*

will feature:

- Which users can make best use of COM (computer output microfilm)?
- Can plotters have any applications to business?
- Printers – impact vs. non-impact, speed vs. copies.
- Is off-line output worth the cost?

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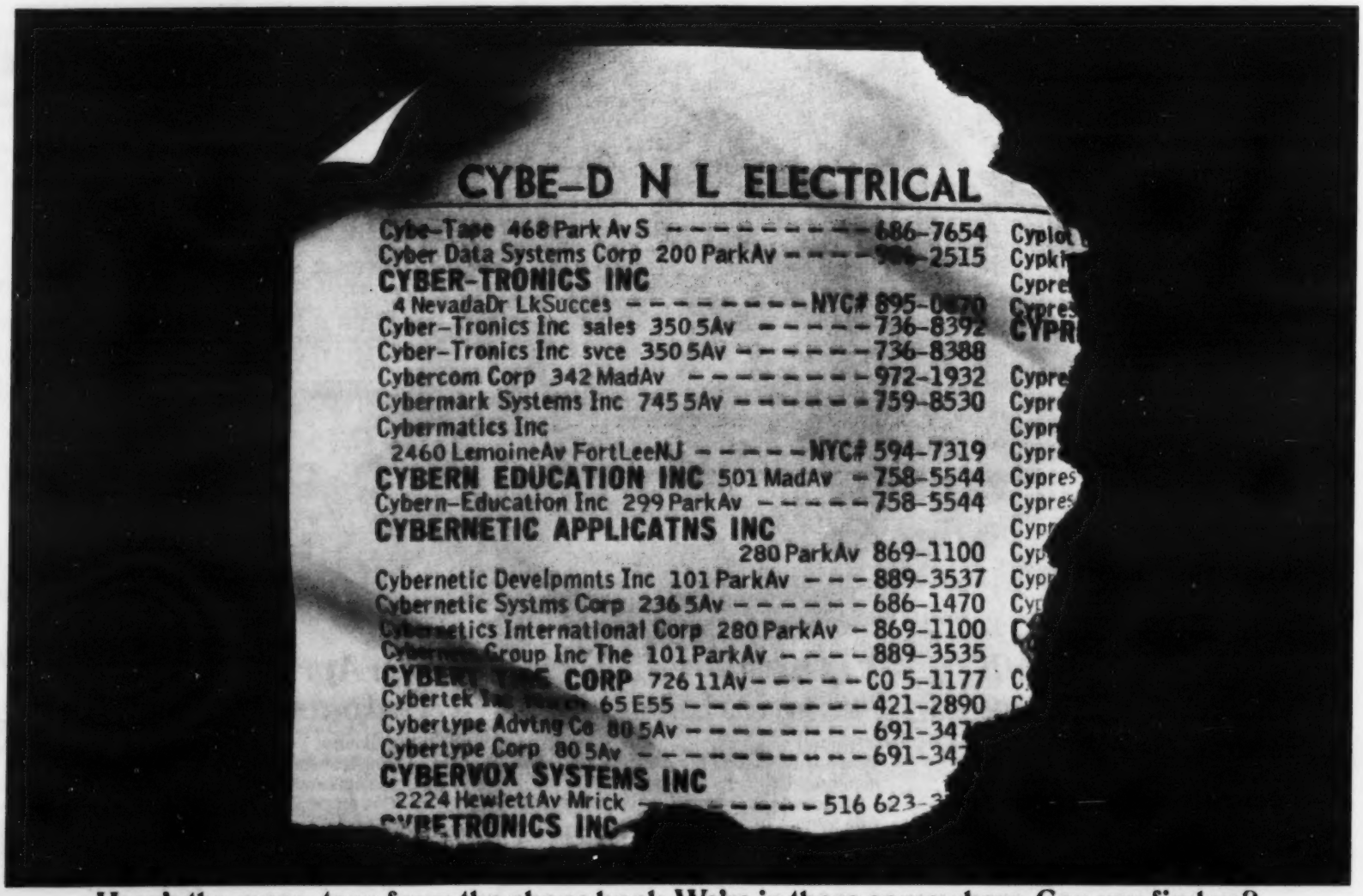
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But when you do, please pronounce it very, very carefully.

# computer industry

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January 13, 1971




## CI Notes

### NCR Cuts UK Century Prices

LONDON – Price cuts of up to 20% have been announced for the Century 100 and 200 machines by NCR in the UK, making comparable machines around $10,000 less expensive in the UK than in the U.S.

Described as part of a new sales policy, they are aimed at maintaining NCR's purchase base in the UK (at the moment 50% of systems are sold on direct sale) and extending its market in the months to come.

So far NCR has only installed 72 machines in the UK and has a backlog of about 30 machines on order, but it expects to double sales in 1971.

Customers using the new Selective Service Plan will receive the Neat 3 compiler and the standard operating system free of charge, but will pay for Cobol compilers and application packages.

### North Electric Orders Datacraft Core Memories

FORT LAUDERDALE, Fla. – Datacraft Corp. has announced that it received a firm order from North Electric Co., Galion, Ohio, for a large quantity of its new DC-38 core memory systems, at approximately $3.5 million. Deliveries will begin in April 1971.

The memories to be supplied to North Electric Co. will be used in the new electronically controlled telephone switching system.

The North Electric version of the DC-38 will have single chassis capacity of 4K words expandable to 64K words with a length of 17 bits. Cycle time for the memory is one $\mu$sec.

### ISO Accepts Interface Standard

NEW YORK – The procedure adopted earlier this year by X3T9, the Ansi committee on input/output interface standardization, has been presented to the International Standards Organization (ISO) group on interfaces and has been accepted as its guide for future work.

The procedure calls for the development of specific and detailed I/O interface requirements which can be used to accelerate and enhance both the creation and the evaluation of proposed standard I/O interfaces.

A position of X3T9, that interface standardization must begin at the channel-to-control unit level, is apparently shared by all members of the international working group. A device-to-control unit interface introduced previously by the UK was withdrawn and left only a channel-to-control level proposal on the table.

## Supershorts

Xidex Corp. has entered into a purchase contract with 3M Co. under which 3M will purchase a substantial quantity of Xidex's heat-developing duplication microfilm. 3M will market the Xidex-HD vesicular film under the 3M Therma-Tone label.

Intercole Systems Ltd., of London has ordered 50 Model 216 and 808 minicomputers from Computer Automation, Inc., Newport Beach, Calif.

An order for 100 Vista CRT terminals to be used in key-to-disk djsplays assembled by Logic Corp., Cherry Hill, N.J., has been announced by Infoton, Inc.

## Strategic Materials Questioned

# U.S. Takes Hard Look at ICL-Soviet Deal

By Alan Drattell
CW Washington Bureau

WASHINGTON, D.C. – The U.S. is currently taking a hard look at recommending approval or rejection of a $15 million computer sale by International Computers Ltd. of the UK to the Soviet Union's computer center at Serpukhov, 60 miles south of Moscow.

The Serpukhov center is tied in with nuclear research work going on at Cern in Switzerland and at Batavia, Ill., as part of a joint project involving the U.S., Soviet Union, and European countries.

ICL would have its own resident engineers on site at the center to handle maintenance work on the system.

**Two factors**

What is making the U.S. cautious about the proposed sale are two factors: The equipment includes some American-made gear and strategic materials are definitely involved.

A very interested onlooker to the request currently under review by the Department of State and Defense is Rep. Chet Holifield (D-Calif.), chairman during the just-ended 91st Congress of the Joint Committee on Atomic Energy. He has threatened to lodge a protest if the sale involved advanced computers.

A State Department source said he hoped decision on the ICL proposal would be made "before too much longer."

What touched off the current brouhaha was a request by Prime Minister Edward Heath of the UK during a visit last month with President Nixon in Washington. Heath asked the President for approval of the sale which includes ICL 1906A computers, now embargoed by Nato countries through the Coordinating Committee (Cocom).

The ICL package would also include 1903A systems, which do not contain what are considered to be strategic materials.

In 1969 the Russians had tried to get a Control Data 6600 computer for a science center, involved in atomic work, but was turned down by the U.S.

In testimony last March before Holifield's joint committee, Vice Adm. H.G. Rickover, director of the division of naval reactors, said that he had told the Atomic Energy Commission that there were, in effect, risks involved in the sale of the 6600 that could not be minimized.

**Soviets and 6600**

He related, however, that the Soviets have access to a 6600 which "has gone to the Cern in Switzerland."

Rickover said that the 6600 is in the "advanced" class of computers. These are defined "as those having a bus rate greater than 50 million bit/sec. The CDC 6600 has a bus rate of 600 million bit/sec."

Bus rate is calculated as the product of the number of memory access/sec times the number of bit/word times the number of overlaps. The 1906A fits into this "advanced" class.

The naval officer said that Cocom controls restrict the export of all computers "except those at the general level of the IBM 360/40 and CDC 3300, in certain configurations, and below. The IBM 360/40 has a bus rate of 6 million bit/sec and the CDC 3300 has a bus rate of 19 million bit/sec." The ICL 1903A fits in this classification.

Normally, The U.S. Department of Commerce would have jurisdiction regarding export of "low-level computers" like the 360/40 and 1903A. Licenses are approved on a case-by-case basis. Commerce specifies in approving licenses that the computers are for civilian purposes and for peaceful uses. Applications for export of advanced equipment to Communist bloc countries require formal interagency consideration and can involve the President as the final arbiter.

Meanwhile, regarding the proposed ICL sale to the Russians, an aide to Holifield told CW that the congressman may go ahead with his protest when the 92nd Congress convenes later this month if the U.S. approves the British application.

What a protest would actually mean could not be determined. However, Holifield's aide said that legislation "to tie the President's hands" could possibly be introduced.

The entire matter may be academic, however, when it comes to concern regarding the Soviets learning U.S. advanced computer technology.

In his testimony, Rickover stated: "I continue to see vast amounts of our technology being given away through open publication. A consistent source is in advertising by firms doing defense work.

"Advertisements devoted solely to military equipment continue to appear in magazines and technical journals, the cost of which in most cases is charged to government contracts. The taxpayers' money is being used to release valuable information to our enemies, information which was developed also at the taxpayers' expense. . .

"A major source of information release is through the publication by defense agencies and their contractors of large numbers of unclassified reports and journals dealing only with military technology. Foreign agents consider this to be the most important means to obtain valuable U.S. technology."

He added that Soviet bloc personnel purchase many reports from the National Technical Information Service (formerly the Clearinghouse) for $3 a copy or less.

## Presidents Predict

# 1971 Economy Will Be Brighter

Year-end statements – summing up 1970 and peering ahead to 1971 – have begun emanating from the executive offices of the computer industry.

The view from the top is that 1970 was bad, but not that bad, and that 1971 will be better, but not that much better.

Thomas J. Watson, Jr., IBM board chairman, predicted that "during the coming year, several sources of strength at work within the economy will contribute to an improving economic climate."

Robert E. McDonald, president of Univac, echoed the sentiment with the prediction that "by the second half of 1971 the economy will resume its upward curve giving even greater impetus to the computer industry's growth pattern.

"The data processing industry was one of the last to be affected by the business dip and many observers believe it will be among the first to recover as the economy accelerates," McDonald said.

Watson said that IBM expects "to see improvement in the coming year as users begin installation of new products introduced in 1970."

**Overseas Market**

Both of the mainframe manufacturers see the overseas market as a strong segment of their business.

McDonald noted that "Europe and Japan continue to be very strong markets for our large-scale systems particularly for real-time applications associated with government services, manufacturing and banking.

"In 1970 we began marketing our communication terminal products on an OEM basis for the first time in Europe. This market is expected to expand considerably in the coming year."

Watson said that "overseas, the sale of data processing and office equipment reached a new high in 1970. During the coming year we expect that the overall international market for our industry's products will remain strong and that operations abroad will continue to be a growing part of our industry."

Despite the expected increase in business in the coming year, Watson called for an end to the Vietnam war in his message, and noted that he supported "some form of incomes policy, such as wage-price guidelines" to prevent acceleration in the rate of inflation.

# VIP Gets Go-Ahead To Sue IBM and SBC On Antitrust Grounds

By a CW Staff Writer

WASHINGTON, D.C. – VIP Systems Corp. has been given the go-ahead to sue IBM and its wholly owned subsidiary Service Bureau Corp. on antitrust grounds.

In Federal District Court here, Judge William Bryant recently granted a VIP motion to amend an earlier suit to permit VIP to include antitrust charges among its claims that IBM has deliberately sought to hinder VIP's activities in the time-sharing text editing field.

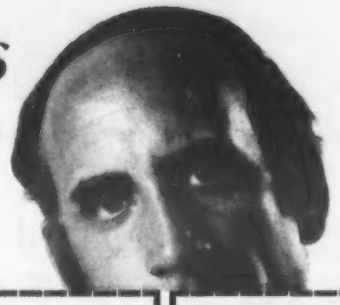
VIP contends that IBM and SBC worked as coconspirators to underprice its Datatext service and that later, when SBC dropped Datatext, IBM deliberately failed to properly maintain VIP's rented 360/40 to prevent VIP from offering a saleable service.

VIP is seeking to bar IBM from selling time-sharing services as well as treble damages for injuries that it claims exceeded $5 million.

IBM spokesman said, as they did when VIP first asked to amend its suit, that the antitrust charges were "entirely without merit" and pointed out that IBM has a suit pending against VIP seeking to collect $300,000 IBM contends VIP owes it for rental fees.

IBM filed last year to repossess VIP's equipment for failure to pay, but the court granted VIP a stay as long as it kept up with its current payments.

# *What most managers don't know about the computer could make them vice presidents.*



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If you're a manager who knows he needs to know more about the computer, but unwilling to take a vow of poverty by returning to school, you'll find this new medium of management education invaluable.

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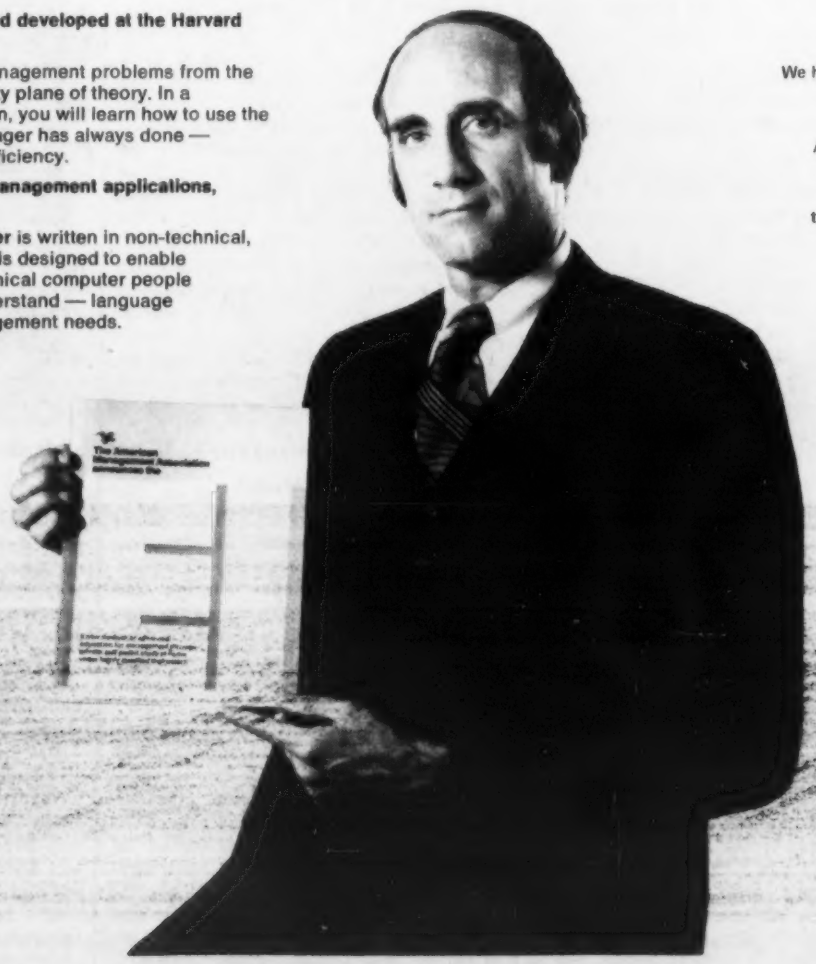

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Computerworld is pleased to recommend **Management and the Computer** to its readers as an effective aid in preventing a communications gap between top management and data processing executives.

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# Signal Sells Flux Ring Array

VAN NUYS, Calif. – Following the first public showing at the FJCC of its new flux ring memory technique, Signal Galaxies is now marketing its first product, the flux ring memory array.

The technique utilizes a batch-fabrication planar technique of thick film elements made with electroplating, photoresist and chemical etching.

The 128-word by 64 bit arrays provide up to 8K bits each and can be assembled into stack assemblies of up to 64K bits. Cycle time is as low as 100 nsec for nondestructive readout or 250 nsec for destructive readout. Packing density for each array is 800 storage bits/sq in. Its word drive current amplitude is 450 mA and digit drive current amplitude is 150 mA.

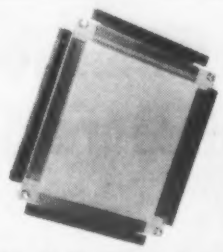
Organization of the flux ring memory array is word select (2D). In addition to the 128 by 64 configuration, other word and bit configurations can provide maximum flexibility in system application.

Price is 7 cent/bit, from the firm at 6955 Hayvenhurst.

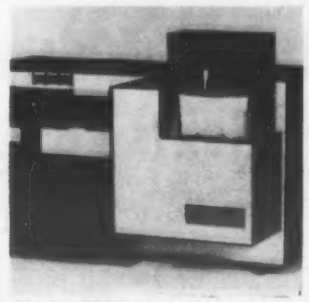
The Prom is expandable from 64 by 8 to 1K by 16, or 2K by 8 in 64 by 8 increments on one PC board. Three of these PC boards may be OR-tied in combination to build a 4K by 16 or 8K by 8 system.

The boards are available in either diode isolation chips or dielectric isolation chips. The diode isolation chips offer a cycle time of 175 nsec and an access time of 200 nsec; the dielectric isolation chips have a 125 nsec cycle time with an access time of 150 nsec.

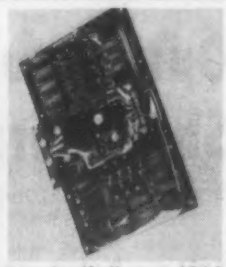
Quadri is at 2959 West Fairmount.



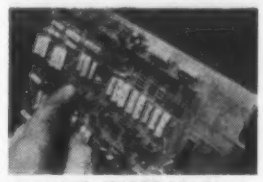
Signal's Flux Ring Array



Model 8060 card reader from Bridge Data.



Standard's Ramm 1024



Intertel's IN202 Modems

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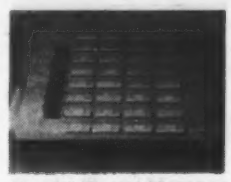

Quadri 'Prom' Memory

## DuMont Shows Tube for Terminals

CLIFTON, N.J. – A magnetically deflected, electrostatic focus, transistor-driven CRT for computer terminals has been announced by DuMont Electron Tubes, a division of Fairchild Camera and Instrument Corp.

The 5-3/8 by 3-3/8 in. tube, designated Type KC2940P31M, can be driven by power supplies suited for transistor and integrated circuit use. The 12.6 V 150 mA heater may be driven directly from a power transformer feeding the low voltage regulated bus.

The P31M phosphor is standard on this tube type, but any other standard or special purpose phosphor can be applied as the screen. Prices are under $45 in production quantities, from the firm at 750 Bloomfield Ave.

## Bridge Data Designs 80-Column Card Reader

PHILADELPHIA – An 80-column card reader wtih a rated capacity of 650 card/min and priced at $2,000 in OEM quantities has been developed by Bridge Data Products, Inc.

The Model 8060 can also handle stub cards at a rate of 650 to 950 card/min.

Mean time between failures of the card reader is greater than 1,000 hours, and the unit's life expectancy is 10 years or 20,000 hours before factory overhaul becomes necessary, the firm claimed.

## Random Access MOS Memory Bows

SANTA ANA, Calif. – A series of random access MOS memory systems for information storage and retrieval applications has been developed by Standard Logic, Inc.

The first group of memories (Ramm 1024) contains 1K words and up to 10 bits on one printed circuit card. The input/output section is structured similar to a core memory and offers nondestructive readout.

The read/write cycle time is 600 nsec. The memory can be obtained with a dc-dc power converter which requires +5 at the input. Multiple Ramm 1024s can be connected for increased word or bit capacities.

Typical price for a 1K word, 8 bit memory in single quantities is $445. Standard is at 1630 South Lyon St.

## Intertel Develops Integral Modems

BURLINGTON, Mass. – Intertel, Inc., has developed the IN202 Series of medium-speed integral modems for use over dialup or private telephone lines at speeds up to 1800 baud. The four models in the series are compatible with Western Electric 202 data sets rented by the Bell System.

Two models, 2020 and 2021, available for use over dialup lines, interface to all currently available data access arrangements. Models 2025 and 2026 are intended for two- or four-wire private lines, with line transformers mounted on the PC card.

Active filters in all models allow operation at receive signal levels of -50 decibel/min and are said to provide lower axis crossing jitter than the WE202.

IN202s are offered at less than $200 in large quantities from the firm at 18 Adams St.

## Semiconductor 'Prom' Memory Introduced at Quadri

PHOENIX – A semiconductor bipolar programmable read/only memory – Prom – is available from Quadri Corp.


Computerworld's 1971 Media File gives you the facts you need.

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# One Result of Facilities Management Shakeout: Clients to Get More Services

By Malcolm L. Stiefel
Special to Computerworld

Facilities management is a relatively new segment of the commercial data processing business, but its feasibility has been established and its future seems assured.

Even the most conservative prophets see 5% of all DP dollars being spent on facilities management in five years. That view is also held by the big companies in the business today, who are already jockeying for position to grab the lion's share of those billions.

If a market of that size develops, it is sure to attract some more well-heeled outfits, to lock horns with Electronic Data Systems (EDS), Computer Technology (CT), and others.

### Shakeout Foreseen

CT President Douglass Parnell sees a big shakeout taking place in this period, with the big market, the Fortune 500 types, served by no more than half a dozen mammoth facility managers when the contest is decided.

He suggests that banks, faced with federal legislation forcing them out of the EDP business, will spin off facility management companies of their own. Other big businesses will follow suit, as LTV did in setting up CT.

The big facility managers will retain and intensify their industry specialization (EDS in health care and insurance, and CT in aerospace and banking).

Moreover, according to Parnell, the survivors will offer their clients services that the clients couldn't possibly get on their own, such as nationwide credit checking, or some other centralized information retrieval service.

This is because, he argues, the efficient large facility manager really won't be able to save the efficient large user any significant money on his facility operation.

### Additional Service

Therefore, the user will benefit if he is given some additional, otherwise unattainable service or if he can participate in the equity of the facility management company.

Cambridge Computer Corp. has taken this data service approach in the wholesale drug industry, where one facility it manages is an industrywide inventory and marketing information center.

The shakeout doesn't mean that the rest of the 50 to 80 companies in the business will return to the dust whence they came.

The users in the $5 million to $30 million class can still expect effective performance from the smaller facility management companies, who will ply their trade in more restricted geographic areas.

### 'Innovative Marketing'

These "little fellas" will continue to sell on a catch-as-catch-can basis ("innovative marketing") unfettered by such expensive cepts as industrial specialization.

ICM in New York is a prime example, with clients in the apparel industry, insurance, and the bakery business. In Boston, Engineering Computer Systems serves a retail chain store, but is about to sign another contract with a consumer service organization.

The large and small companies will continue to differ. In the face of CT's assertions about cost, The Computer Exchange and its West Coast subsidiary, Computer Synergistics, "guarantee an immediate 20% savings on current EDP costs." Whether that sort of offer is still being made in five years remains to be seen.

### Users Without DP Facilities

A trend among the small companies will be toward the acquisition of contracts with users without EDP departments. This practice, already begun in some quarters, will spread, as users turn to facility managers rather than face the "coming of EDP" alone and unarmed.

Many facility managers will continue to come from the ranks of software companies seeking to diversify, like Brandon Applied Systems and Keane Associates. Computer Sciences Corp., with interests in many areas, is in facilities management. Others start out as service bureaus.

*Malcolm Stiefel is an independent consultant with extensive experience in systems analysis, design, and evaluation.*

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## *Orders and Installations*

Five manufacturing firms have installed NCR Century 100 computer systems for such uses as payroll processing and accounts receivable. They are: Norwood Mills, Janesville, Wis.; Viking Industries, Chatsworth, Calif.; Baker Manufacturing, Evansville, Wis.; Caradco, Inc., Dubuque, Iowa; and Kunkle Valve, Fort Wayne, Ind.

**Ethiopian Airlines has ordered a medium-scale Burroughs B2500 computer system valued at more than $400,000 for installation at the airline's head office in Addis Ababa.**

Univac has announced the following new orders and installations of its 9000 series of computers to be used for such purposes as payroll processing, general accounting, and inventory control: 9200 systems ordered or installed by Hobbs Manufacturing Co., Inc., Worcester, Mass.; The Felters Co., Millbury, Mass.; Arrow Armatures Co., Hudson, Mass.; Staylastic/Scovill, Inc., New Bedford, Mass.; Worcester Telegram & Gazette, Worcester, Mass.; Mass. Teachers Assoc.; Boston; Sanyo Automat Manufacturing Co.; Saitama Prefecture, Japan.

A 9200-11 system has been ordered by Yasuda Gakuen Senior High School in Tokyo for instructing students. 9300 systems have been ordered by Acme Engineering & Manufacturing Corp., Muskogee, Okla., and by Rysons Foods, Springdale, Ark., Kanashi Shipbuilding Co. of Shimizu, Japan, has installed a 9300-11 system.

**Picatinny Arsenal, Dover, N.J., has installed a Control Data 6500 computer system, valued at $5 million, for scientific research.**

Manton Cork Co., Merrick, N.Y., has installed an IBM System/3 for daily sales analyses of hardware, houseware, stationery, industrial and variety items.

**Security Title Insurance Co. of Los Angeles has ordered a Dataplex system from Data Instruments Co. for preparation of invoice and escrow disbursement forms.**

The General Purchasing Office, a department of the Ministry of the Treasury of the Italian Government, has ordered a large-scale optical character recognition system from Recognition Equipment Italia, S.p.A. The equipment, valued in excess of $1 million, will be used initially for a large file conversion for the Ministry of Justice.

**Camfour, Inc. of Westfield, Mass., has installed an IBM System/3 to control its inventory and analyze its sales.**

Bankdata, Orebro, Sweden, has ordered a Burroughs B6500 computer system valued in excess of $2 million.

**A Sanders System 6000 has been installed at Eastern Airlines passenger revenue accounting department in Miami, Fla., and is processing one million ticket sales records a month.**

# GT&E Shows Its Colors In European DP Markets

CW European Bureau

LONDON – Following hard on the heels of its acquisitions of U.S. software and minicomputer companies (Programming Methods Inc. and Tempo Computers Inc.) General Telephone and Electronics has announced plans for a three-pronged venture into the computer and communications markets of Europe.

Under the umbrella of GT&E International, New York, and in cooperation with Thorn Electrical Industries of Britain, the company has launched a telecommunications company, Thorn-General Telephone Ltd.; has acquired a UK-based peripherals concern, Datatech; and has formed a new subsidiary, GTE Information Services, with the intention of moving into the service bureau markets of Europe.

Thorn, with whom GT&E has been associated both at technical and financial levels for many years, has taken a 25% holding in GT&E International, a 50% holding in Thorn-General Telephone, and a minority interest in Datatech. GTE Information Systems is a wholly owned subsidiary of GT&E International – giving Thorn a minority interest through its shareholding in the parent company.

Thorn-General Telephone will specialize in all aspects of telecommunications initially concentrating on the development of PABX systems in an attempt to crack the previously closed UK market.

Datatech will continue to develop and expand its existing range of terminals and other peripherals, and both this company and Thorn-General Telephone will contribute to the hardware development of GTE Information Systems. This company will be operationally based in the UK and is believed to be planning a series of time-sharing/remote access bureaus, covering Western Europe and based on large machines possibly drawn from the IBM 370 range.

With Datatech already having an established product line, the real gamble for GT&E will be the information services company. It enters a market which at best must be considered small and which has shown little sign of active growth over the past few months.

Already this market sector has seen one casualty: the closure of operations of Computer Data Systems International, Washington, D.C., which was to have established a similar chain of bureaus in major European centers based on the medium/large ICL 1904A.

# Commerce Schedules Show in France for U.S. Firms

WASHINGTON, D.C. – The Department of Commerce has scheduled an exhibition of computer equipment in France June 7-11 as a further effort in its "Go-Global" marketing program to help U.S. manufacturers increase their exports of computer equipment.

The announcement of the show follows closely on the heels of a report estimating that U.S. firms lined up around $100 million in projected business from Commerce's first effort in this field – an exhibition in Tokyo last October.

Market research conducted for the Commerce's Bureau of International Commerce, which is supervising the program and will stage the exhibition, estimates the value of EDP installations in France in 1969 at $1.8 billion, with the industrial share set at $720 million.

The French EDP market in 1969 amounted to $387 million, with 22% of this demand met by imports, the BIC study reveals. More than one-third of the imports, $29.9 million, came from the U.S.

The study projects annual sales growth of 20% through 1974, when the market is expected to approach $900 million, with imports of $264 million. Based upon projections of French EDP imports over the period 1970-74, the BIC study continues, U.S. exporters should supply equipment valued at $266 million.

French economic sources forecast a 25% annual growth rate for small EDP systems, BIC's study continues. The Bureau d'Information et Prevision Economique (Bipe), a semipublic group, reported EDP utilization in 1969 was about 37.5% among large or medium-sized firms and 62.5% among small firms.

By 1975 the same French group expects this ratio to change substantially with small companies employing 1,000 or less, accounting for three out of every four EDP installations.

U.S. systems suppliers have conservatively estimated the number of computers in France will increase to 13,000 by the end of 1974, with the French industrial share of this total reaching 5,700 against less than 2,000 in 1969.

BIC reports electronic data processing equipment with the highest sales potential in France includes large scale computers, optical character readers, keyboard-to-magnetic tape encoders, direct access storage devices, and data transmission terminals such as small computers, remote facsimile units, data acquisition equipment, CRT displays, on-line typewriters and cash registers, and high-speed printers.

# Boeing Computing Services Formed As 'Fourth Largest Company of Kind'

Special to Computerworld

SEATTLE – The Boeing Co. has spun off its computing division into a separate corporation, calling its new subsidiary "the fourth largest company of its kind in the nation."

Boeing Computing Services, Inc. has been incorporated as a Boeing subsidiary, according to T.A. Wilson, Boeing president. "This subsidiary further demonstrates that we are in the computer business to stay," Wilson stated.

The new firm, a Delaware corporation, is the first domestic subsidiary formed by Boeing in recent years. The move follows an earlier step in the same direction, which centralized computing into a company division in May of 1970.

Corporate officers include Wilson, chairman; Robert W. Tharrington, president and chief executive officer; and J. Harry Goldie, executive vice-president.

The new firm will continue to be closely allied with Boeing. Wilson pointed out that the parent company would continue to be BCS's largest customer.

"We already have more than 280 outside customers," a spokesman reported. The firm is selling nationwide and in British Columbia, and expects to go beyond the U.S. and Canada in developing and serving markets.

The firm forecasts a 1971 business volume of $90 million to $100 million.

The company has no present plans to manufacture computing equipment, but said "we will be looking at it." Current services offered include systems analysis, software development, facilities management, computer time, and time-sharing. The company has IBM 360 and CDC 6600 computers.

# REI OCR, Microfilming and Sorting System Allows On-Line Data Capture

DALLAS – A new optical character recognition, microfilming, and sorting system, designed for European banks, has been announced by Recognition Equipment Inc. The new system plugs directly into IBM 360 and 370 computers as well as REI's programmed controller.

The OCR/S2000 can read single lines of machine-printed numerics in OCR-B and 1403 fonts, plus several special symbols. Maximum throughput rate of a single document processor is in excess of 2000 document/min.

The system, when connected to any of the allowable computers, can provide on-line data capture, while simultaneously performing independent sorting of documents. The system also performs off-line sorting only if this fits the customer's requirements.

The Swedish Postal Bank, Stockholm, has placed the first major order for lease of the new system. Purchase value of the initial order is approximately $3 million, with the Swedish Postal Bank having an option to purchase additional equipment that would bring the total purchase value to approximately $5 million.

The basic OCR/S2000 system includes a 12-pocket document transport, a reading unit, a minicomputer control unit, and an optical channel adapter that allows the system to operate on-line with IBM 360 and 370 computers or with the programmed controller.

Several systems can operate simultaneously when connected on-line to a single system controller – the number dependent on which computer is used. Up to five systems can be connected on-line to an REI programmed controller that functions as a system controller, providing a combined throughput of more than 10,000 document/min.

The initial order for the Swedish Postal Bank includes two programmed controllers and associated magnetic tape units and line printers in addition to five document processors. The add-on order would include six more OCR/S2000 systems.

# Air Force Command Forecasts Purchases

HANSCOM FIELD, Mass. – The electronic systems division of the Air Force Systems Command here has released a forecast of future computer equipment purchases.

The report lists a total of seven planned computer buys – three of which were to have been issued in the last quarter last year, but which have slipped somewhat.

The three purchases involve replacement of an IBM 1710 process control system at the Oklahoma City Air Materiel Area; acquisition of five magnetic tape devices plus the capability to consolidate short data tapes onto a single reel for input to a B3500 system at Aeronautical Chart and Information Center, St. Louis; and the replacement of PCAM installations at five Military Airlift Command overseas bases with small data processing systems.

During the first quarter of this year, the Command plans to solicit bids for the replacement of an IBM 7044/7094 at the Air Force Flight Test Center, Edwards AFB, Calif.; and replacement of an IBM 360/65, two IBM 7094s, one IBM 1620, two CDC 3600s, and two CDC 3100s at the Eastern Test Range in Florida.

In the second quarter of 1971, the Air Force is planning to replace an IBM 7040 at the Air Force Human Resources Laboratory at Brooks AFB, Tex. During the same time span, the McClellan Central Laboratory in California will replace an IBM 1620/1401 direct couple system to provide for increased processing capability.

The forecast, according to Col. Robert F. Jensen, director of ADP Equipment Selection Directorae, is tentative and should be used only for planning purposes.

# Richard Gottier Named to Direct CDC's Computer Manufacturing

MINNEAPOLIS – Richard C. Gottier has been appointed vice-president and general manager of Control Data Corp.'s computer manufacturing operations and will be responsible for the manufacture of all computer systems, components, and main memory devices.

***Executive Corner***

Gottier joins CDC after 12 years with the Magnavox Co. where he served as director of manufacturing in the government and industrial products division. Previously, he was associated with RCA.

### Other Moves

Richard P. Sprigle, president of Electronic Memories and Magnetics, Inc., has announced the promotion of three executives at Caelus Memories, Inc., a subsidiary of Electronic Memories and Magnetics.

William P. Sousa has been appointed vice-president of operations; Rowland Chew has been named director of manufacturing, and Jack E. Payne has been elevated to director of manufacturing operations at Caelus Memories, San Jose, Calif.

- Honeywell Information Systems, Waltham, Mass., has named John L. Wilson a vice-president of computer systems operations in charge of plant facilities in Framingham, Mass., and Peterborough, N.H.
- Robert S. Rosenthal has been named vice-president of Management Research International, Inc., Austin, Texas.
- William P. Murphy has been appointed vice-president, finance for International Data Corp., Newton, Mass.
- Harold R. Harding has been elected vice-president and a member of the board of directors of Systemation, Inc. of Boston.
- Time-Zero Corp., Torrence, Calif., has appointed Robert L. Hengen president and chief executive officer.
- Carl F. Fisher will be the new senior vice-president for finance and operations of Tracor, Inc. of Austin, Texas.

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# Retail Chain Plans Increased Use of Computerization

CW Midwest Bureau

ROCKFORD, Ill. – Montgomery Ward and Co. has opened what it calls "the world's largest computer-operated retail store" here.

Edward S. Donnell, Ward's president, said the new store, which has 120,000 sq ft of selling space, "is the prototype of our supersize modular store." Another supersize store is scheduled for Fresno, Calif., this year, he added.

Ward's now has 16 modular stores and plans to increase that number to 51 by 1975, all having about 65,000 sq ft of selling space, the Ward's president said.

Donnell stressed the computerized aspects of the new store, saying that it will eliminate much of the non-selling workload, giving personnel much more selling time. He also explained that with the computerization there was a reduction in the number of basic personnel needed to man the operation, citing 225 people versus the conventional store's 345.

This store, as do most stores in the Ward's national chain, uses class 5300 NCR cash registers. The tape journals from this store are sent to the merchandising data center Ward's maintains in Meriam, Kan., where they are scanned on NCR 420 readers or on IBM 1287s that have the optional journal tape reader devices.

A tape program, running the data on IBM 360/50 in what Ward's calls a replenishment program, takes the sold items out of inventory and prints out a replenishment analysis. After approval by a merchandiser, the analysis goes to ordering.

### Analyzes Seasonal Trends

The system also analyzes seasonal merchandising plans by noting color trends, style trends, and sizes in relation to each other. The system also prints out the reorders and the actual purchase orders.

"You have to remember," said Jack Jacobsen, Ward's programs manager of retail merchandising systems, "that these are not programs on bathing suits or bathtubs, these are programs on stores, individual stores."

He explained that a bathing suit replenishment program on an all-store basis would not have the practicality of individual store replenishment programs, "Not when a bathing suit program would have to fit both Minneapolis and Santa Fe."

### Future Emphasis

Earlier this year, Donnell announced Ward's intentions to stress computer implementation in retailing. At that time he said: "I would doubt that more than 20% of the goods sold in stores today are affected by the computer. In the 70s, that figure should rise to between 90% and 95% of all merchandise."

Donnell said Ward's is planning to spend $125 million over the next four years to develop and research computer implementation. He cited the $20 million/yr cost reduction in Ward's catalog mail-order sales and predicted a tripling of that figure on computer implemented retailing.

Computerization, Donnell claimed, would result in "better capital utilization through improved inventory turnover and a lower markdown rate.

"When we get to that point," he said,"and we expect to in the next few years, we also believe that we can reduce our retail payroll costs by 20%."

## Wabash Moves Headquarters

PHOENIX – Wabash Computer Corp. has moved corporate headquarters to new 20,000 sq-ft quarters in the former Southwest Research Corp. building at 10202 N. 19th Avenue.

The company's two divisions have changed their names and have their headquarters at the new facility. They are computer network division, formerly information network division, and computer equipment division, formerly PI or peripherals division. The manufacturing operation of computer equipment division is at 2045 W. Cheryl Drive.

Computer equipment division manufactures disk pack testers and memories and related equipment.

## Expansions

### Other Expansions

**Edwin Industries Corp., Silver Spring, Md., has relocated its sales and manufacturing facilities to new quarters at 11961 Tech Road.**

Vendere International Marketing Corp., Torrance, Calif., has opened new marketing and support offices at 1805 S. Bellaire St., Denver, and 20100 W. 10-1/2 Mile Road, Southfield, Mich.

**Time Share Peripherals Corp. has moved to larger quarters on Miry Brook Road, Danbury, Conn.**

Data 100 Corp. has opened a new corporate headquarters and product development center in Edina, Minn. The new 35,000 sq-ft facility will be occupied by the firm's administrative, marketing, and product development staff and is at 7725 Washington Ave. S.

**First Business Computing of Houston has moved its scientific and commercial division to quarters at 1644 Old Spanish Trail.**

Peripheral Equipment Corp., Chatsworth, Calif., has opened two sales offices at 339 South San Antonio Road, Los Altos, Calif., and 3731 Camelot Drive, Annandale, Va.


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# 'Purdax' Meter Reading Relies on Unconventional

CW Midwest Bureau

SPRINGFIELD, Ill. – Sangamo Electric Co.'s system for automatically reading electric, gas, and water meters combines the functions of meter reading, communicating, and preprocessing the data onto a computer-compatible magnetic tape for billing and accounting functions.

The public utility revenue data acquisition and collection system (Purdax) does not use telephone company facilities, power lines, or conventional radio transmission.

The meters used in the system, the company explained, are the conventional watt/hour, gas, or water meters equipped with a single pole, double throw switch on the registers.

Sangamo said the meters are commercially available. Low voltage wiring is required from each meter to the data accumulator.

The accumulator, according to Sangamo, is a solid-state package suitable for mounting either indoors or outdoors, with distance to the meter not a factor, except for installation costs.

The accumulator collects, scores, and scans contact transfers from several meters and transfers the data on a low voltage dc pulse train, giving a complete binary message from each of the meters its serves.

A typical 8-channel unit might have a complete message length of 2,300 bits, which is passed in repeat fashion by wiring a transponder, according to the company.

The transponder is the unique and proprietary parcel of the system, Sangamo said, and should be located no closer than 30 ft from an adjacent unit and have a clear view of the street, mounted preferably 10 ft to 20 ft above the ground.

The transponder is activated by microwave radiation from a passing vehicle. The complete messages of eight to 12 meters are received through the transponder and from the accumulator in a distance of less than 30 ft at a speed of about 20 mph.

### Invalid Data Discarded

The cruising vehicle possesses a decoding and verification unit (DVU) which discards any invalid data, Sangamo said. The unit can be interfaced with almost any output or recording device, since the data has been decoded into BCD format.

The company suggests the use of a computer-compatible magnetic tape recorder for the application. The truck, then, according to Sangamo, could deliver a tape which would bypass keypunching of route books or processing of mark sense cards and go directly to computer entry for monthly billing.

Pilot tests conducted with a prototype system indicated that Purdax was able to read automatically, communicate, and record data from approximately 100,000 meters in a month using a data acquisition truck on a one-shift basis, Sangamo said. An operating expense of 14 cent/meter is estimated.

# Newcomer to COM Field Expects Success in 1st Year of Operation

CW West Coast Bureau

PALO ALTO, Calif. – A recent entry into the computer output microfilm (COM) field is predicting successful operations for its first year of marketing.

According to B.J. Cassin, vice-president of marketing for Xidex Corp. here, the firm will do over $1.7 million in business during its first year of full operation. The firm – which was formed by former Memorex employees – started in July of 1969, but marketing efforts began later.

In the firm's first three months of marketing operations, just ended, it had sales that were just under $400,000, Cassin said, based on two products, a microfilm duplicator and film.

At present, Xidex plans to announce a 200 ft/min film processor microduplicator that will sell for $7,950. It will be available for $220/mo on a full payout purchase plan.

## *Emerging Enterprises*

# Valid Data to Offer Consulting Services To DP Community

ROSLYN HEIGHTS, N.Y. – Valid Data Inc., a data processing consulting firm, has been formed to offer consulting and data services to the general data processing community as well as to firms that do not have data processing equipment of their own.

A consulting division will provide consulting services as well as systems design and programming assistance to medium- and large-size firms that either have DP equipment installed or on order. The division would also provide guidance to smaller firms that do not have a full-time computer.

### Other New Companies

A new marketing firm, Tracor Data Systems Marketing, Inc., has been formed in San Francisco to market the computer products manufactured by Tracor Data Systems. The new company will be responsible for domestic and international marketing to end users of time-sharing computer systems and computer peripherals produced by the Tracor group of companies.

Dynamic Peripherals Inc. has been formed in Westford, Mass., to develop and manufacture digital cassette tape drives and equipment utilizing these drives. Some of the equipment to be produced will be a digital data recorder and an auxiliary memory machine for minicomputers.

The Aerojet Electrosystems Co., Azusa, Calif., has been formed by Aerojet-General Corp. to provide electronic sensor and data systems for advanced military/space requirements. Products of the new company include satellite systems, infrared sensing equipment, and system design and management of large-scale data systems and equipment.


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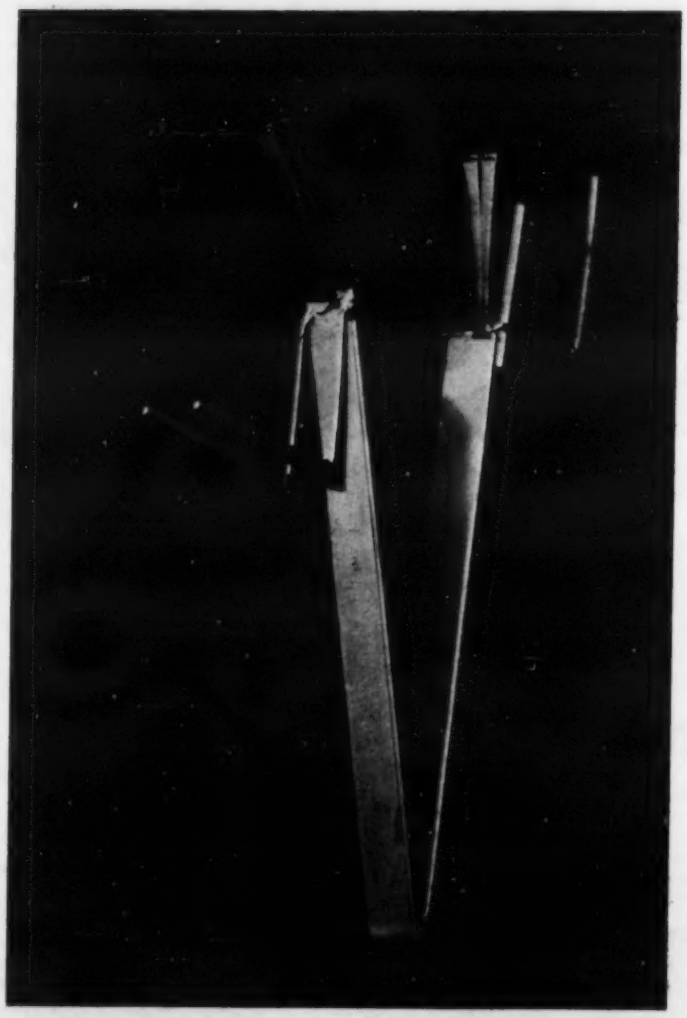

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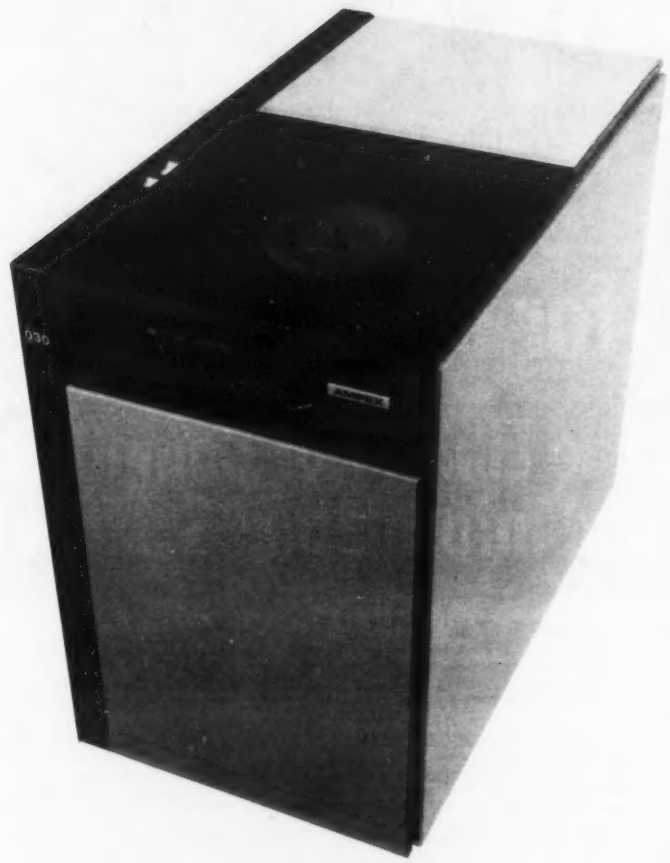

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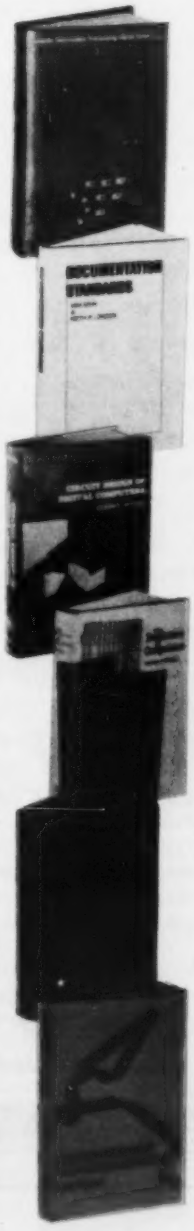

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## Nickels and Dimes

**Quantor Corp.**, makers of the Series 1.2.3. COM system, has developed a $1 million backlog for its unit within two months of its announcement. The Cupertino firm has also contracted with a financial orgainization to sell at least $5 million of the systems over the next three years.

Quantor's president, Charles Askanas, predicted that by 1975 the market for COM devices will reach $90 million, and that if ancillary hardware and software are included the total COM systems market will be $200 million by mid-decade.

$$$

Activity on the refinancing front:

The Talcott Computer Leasing division of James Talcott, Inc., has provided **Colorado Instruments** with a $2.5 million line of lease financing. Money will be used to support the Source Data Collection Systems.

**Wang Computer Products**, maker of synchronous tape drives, has completed its latest round of equity financing through The Foothill Group. Though the amount was not disclosed, company Presient Dr. Ben W. Wang said that it will aid the production of tape drives "against a $3.6 million backlog of firm orders."

And **Wellington Computer Systems** has arranged for $4.2 million of new financing for its consulting and programming work, and the operation of its Telemax Corp. subsidiary, a reservation service.

$$$

CW's staff of spies has come up with a confidential memorandum circulating among brokerage houses specializing in bringing software houses to the market.

The memo deals with the naming of new companies, and provides a list of words designed to bring investors running, checkbook in hand. Top 10 on the list were:

Urban, environment, human, resource, eco (xxx), geo (xxx), conservation, pollution, dynamic, and systems.

Runners-up were earth, air, fire and water.

The only holdovers from the list circulated five years ago were dynamic and systems. Others on the earlier list were synergistic, sciences, data, technology, computer, electronic, information and management.

One from column A and two . . .

$$$

And from the rumor file comes word that two independent peripheral manufacturers, one in disks and one in disks and tapes, have been given six months by their bankers to find a way out of the IBM price nutcracker or no more money.

# Honeywell Earnings Drop Seen

MINNEAPOLIS – In a statement detailing changes in accounting procedures for the new Honeywell Information Systems, Honeywell Board Chairman James H. Binger predicted a drop in earnings from the 1969 level.

Binger reaffirmed that the company does not expect dilution in earnings for 1970 as a result of the acquisition of a major portion of GE's business computer operations. However, he cautioned that Honeywell earnings have been under pressure as a result of ecnomic conditions generally.

"The fourth quarter is proving to be more disappointing than previously anticipated," Binger said. "The continually expected upturn has not occurred and the downtrends that we have previously noted have persisted."

"The unexpected duration of the earnings pressure we have encountered," he said, "will make it difficult for us to equal our earnings of last year, which were $3.69 per share on a pro forma basis taking the merger into consideration."

He said bookings and backlog are up in the information systems business on a worldwide basis but that a softening has become apparent in some segments in the U.S.

Binger added that the organization and other changes resulting from the merger of GE's computer business have now been essentially completed.

Honeywell has conformed the accounting practices of the merged Honeywell and GE computer businesses, effective Oct. 1, Binger said.

## Financial

The merged computer operations have adopted the Honeywell practice of charging to inventory or capitalizing in rental equipment a portion of hardware R&D costs, and also most factory costs classified as manufacturing overhead.

It had been GE's practice to write some of these costs off currently.

Binger said the company has changed from a six-year to a five-year depreciation schedule for equipment shipped after Oct. 1. Honeywell and GE rental equipment shipped before Oct. 1 will be depreciated on whatever schedule was originally applied to it.

Honeywell used six-year straight line; GE used a five-year, or in some cases a modified sum-of-the-years approach.

"As we have previously reported to the financial community," Binger commented, "conforming to the Honeywell accounting basis with regard to capitalizing some costs for the combined computer operations will have the effect of improving reported operating results. This will be offset to some extent in the future by the fact that we have adopted the more conservative five-year depreciation schedule.

"When determined at year-end, the effect of these conforming changes on 1970 results will be reported," Binger said.

# Pergamon Write-Down Increases Leasco Loss to $30.8 Million for Fiscal '70

NEW YORK – Writing off its share of British publisher Pergamon Press to the tune of $24 million, Leasco Data Processing had a net loss of $30.8 million for the fiscal year ended Sept. 30.

Extraordinary charges for the year, of which the Pergamon write-down was the largest, totalled $43.7 million, but were reduced to $40.3 million by a tax benefit.

In the 1969 financial year Leasco showed a profit of $43.9 million, equal to $2.40 a share fully diluted.

Leasco now owns 38% of Pergamon, which it has revalued at $1. The firm called off its long-standing bid for the rest of Pergamon a month and a half ago, after discrepancies in Pergamon's books were revealed [CW, Nov. 25].

The computer services and insurance company experienced other losses from changes in its accounting methods.

The major accounting change was to charge start-up costs as incurred, rather than deferring and amortizing them over two to five years.

This change caused a charge of $11.3 million against operating income in 1970 for costs of starting a time-sharing and programming service. A sum of $6.5 million that had been deferred before fiscal 1970 for this purpose was written off as an extraordinary charge.

Other major changes were $5.7 million for a write-down of unused time-sharing equipment, $1.9 million for a reduction in the carrying value of undeveloped land, $2.5 million as a provision for termination of discontinued operations, $2.7 million for the discontinuance of and the write-off of investments in two European companies, and $400,000 for miscellaneous write-offs.

Following the accounting changes, the leasing, consulting, programming, and time-sharing units of the company had an operating loss of $4 million from continuing operations. In the year earlier these units showed an operating profit of $1.6 million.

Net income from the insurance operations rose to $16.6 million from $14.9 million the year earlier. Net realized gains from the insurance investment portfolio fell to $898,000 from $18.9 million.

Combined revenue for all of Leasco's operations rose 15% to a record $531.9 million from 1969's $464.3 million. Insurance revenue rose to $422.1 million from $380.7 million. Other revenue rose to $109.8 million from $83.5 million.

The company said that consulting and programming operations are currently profitable, but that "substantial losses continue to be sustained" in the time-sharing sector.

# EM&M Says Loss Could Hit $14 Million

LOS ANGELES – Because of special pretax charges of $16 million, Electronic Memories and Magnetics Corp. is anticipating a net loss of $12 million to $14 million for 1970.

The bulk of the special charge – $10.5 million – comes from an increase in the provision for possible losses related to disk packs sold to a third party leasing company in the fourth quarter, and the deferral of a portion of the profits from such sales made in 1970.

Other special charges totalling $4.5 million were produced by losses from certain discontinued foreign operations, a discontinued printed circuit plant, and the write-down of certain slow-moving inventories and assets.

A reserve of close to $1 million was set up against possible losses from EM&M's investment in Mascor Corp. of Cupertino. The company said that Mascor, a maker of mainframes, has been unable to obtain adequate additional equity financing, and would have to suspend its product development program.

# ILC's Financing Plan Completed

NEW YORK – Independent Leasing Corp. has completed $142.7 million of financing in accordance with plans previously reported by Memorex Corp. The financing has been provided by a group of commercial banks, insurance companies, institutional investors, and Memorex.

Of the $142.7 million total financing Memorex will provide $28.5 million.

ILC was organized in June 1970 to purchase and lease Memorex computer peripheral equipment. Funds provided by the financing, together with ILC's internal cash flow, will be used in 1970, 1971, and 1972 to purchase $197 million of Memorex equipment which represents the major portion of Memorex's projected equipment production, an ILC spokesman said.

The financing was closed on Tuesday, Dec. 29, 1970.

The creation of ILC caused a storm of protest when Memorex included sales to the as yet uncapitalized firm in its earnings report.


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# Acquisitions

**Sierra Research Corp.**, Buffalo, N.Y., has acquired **BCD Computing Corp.** of Deer Park, L.I. Sierra Research produces computerized radar equipment. BCD specializes in computer engineering and the manufacture of electronic filing systems.

**Telefile Computer Corp.**, Newton, Mass., has acquired **Interactive Data Systems (IDS)**, Irvine, Calif., for cash and Telefile common stock. IDS will operate as a subsidiary of IDS, and will be known as Telefile Computer Products, Inc.

**EDP Technology Inc.**, has agreed in principle to acquire the **Electronic Futures Division** and certain other assets of KMS Industries in exchange for about 80% of EDP Technology stock. The Electronic Futures Division manufactures learning systems and high-performance television systems.

**Varadyne, Inc.** has agreed in principle to acquire **Tel-Tech Corp.**, Rockville, Md. Varadyne manufactures computer components. Tel-Tech produces data communications equipment.

**Planning Research Corp.** has acquired **Realtronics of Denver, Inc.**, a company providing computerized services to the real estate industry.

**Alta Data Corp.**, Palo Alto, Calif., has become a subsidiary of **Monarch Financial Corp.**, San Francisco. Alta Data developed a program to assist in financial planning.

# Recognition Equipment Cites Factors For Estimated Loss of $10.8 Million

DALLAS – Recognition Equipment Inc. has reported an estimated consolidated net loss for fiscal 1970, ended Oct. 31, of about $10.8 million or $2.12 a share compared with net income of $4.2 million or 82 cents a share for fiscal 1969.

Revenues for fiscal 1970 were $35.1 million compared with $35.7 million for fiscal 1969.

About $9 million of the loss was due to a decision to show previously capitalized research and development costs as an extraordinary charge in 1970 and to charge all such costs as incurred beginning with 1970.

Another factor in the loss was the establishment of more than $2 million as a reserve against possible losses on investments. Without the accounting change and other extraordinary items, Recognition Equipment would have reported a net profit for fiscal 1970, the company said.

Recognition Equipment's shipments and orders booked during fiscal 1970 exclusive of those involving its affiliate, Corporation S, showed an increase over fiscal 1969. Total shipments had a purchase value of $34.5 million, including $7.1 million to Corporation S. Excluding Corporation S in both years, fiscal 1970 shipments showed a slight increase over fiscal 1969.

The backlog of signed contracts and letters of intent at year end, excluding Corporation S, was more than $26 million, an increase of about 25% over the comparable figure at the beginning of the year.

The reported backlog does not include a $6.9 million contract from the United States Postal Service.

"The prospects for Recognition Equipment appear bright due to successful new products and a sound financial condition," said President Herman L. Philipson Jr. "We expect to operate profitably during fiscal 1971 after expensing all research and development, and 1971 shipments should equal or exceed those for 1970," he said.

# Viatron Sees Favorable Response By Bondholders to Exchange Offer

BEDFORD, Mass. – Viatron Computer Systems, Inc., currently trying to overcome a default on interest payments for its convertible debentures, "expects a most favorable response" to its offer to exchange the bonds for common stock in the company.

Bondholders must have responded to the offer by Jan. 8. Viatron missed the interest payment due Dec. 1, and the debentures technically went into default on Dec. 31.

For the exchange offer to be accepted, holders of 85% of the $15 million debenture issue must agree to the exchange.

The exchange calls for Viatron to issue 200 shares of common for each $1,000 debenture. This places a value of $5 a share on the common, which has recently sold between $1 and $2.

A Viatron spokesman also said that the firm's management has held a number of talks with the protective committee formed by debenture holders late last month [CW, Dec. 30-Jan. 6].

The spokesman also said that the trustee for the debentures, the Old Colony Trust Co. of Boston, has not taken any action of the default "to my knowledge."


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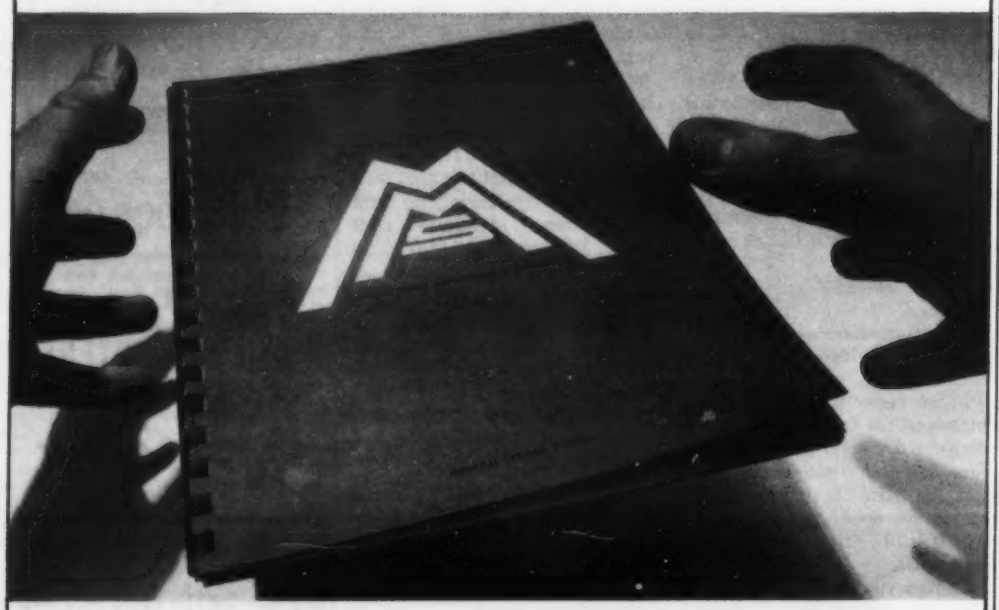

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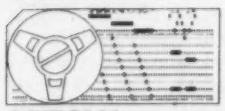

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TRADE*QUOTES

# Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

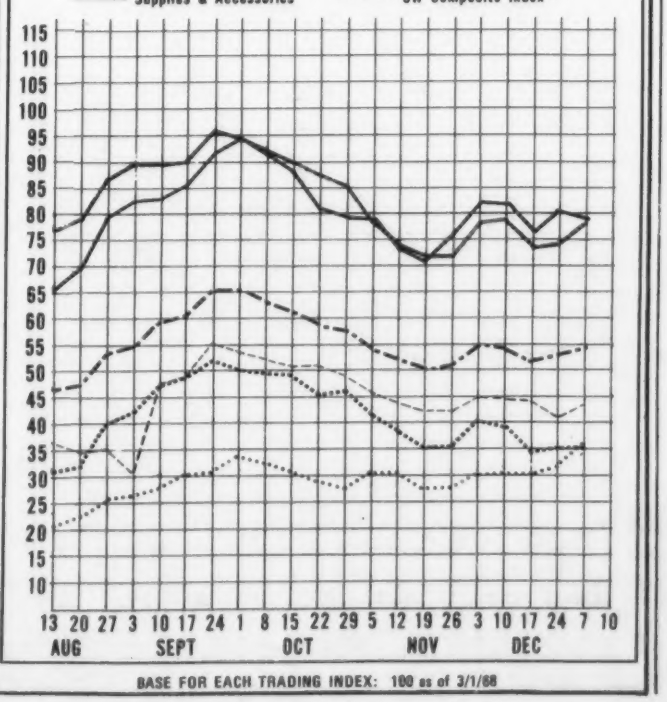
CLOSING PRICES THURSDAY, JANUARY 7, 1970

| EXCH | | 1970 RANGE (1) | CLOSE JAN 07 1970 | 2 WEEK* NET CHNGE | 2 WEEK* PCT CHNGE |
|---|---|---|---|---|---|
| | **SOFTWARE & EDP SERVICES** | | | | |
| O | ADVANCED COMP TECH | 1- 6 | 2 | - 1/8 | -5.8 |
| A | APPLIED DATA RES. | 4- 24 | 5 1/4 | + 3/4 | +16.6 |
| O | APPLIED LOGIC | 1- 18 | 1 1/2 | + 3/8 | +33.3 |
| O | ARIES | 1- 8 | 1 3/8 | 0 | 0.0 |
| N | AUTOMATIC DATA PROC | 23- 48 | 46 | +1 5/8 | +3.6 |
| O | AUTO SCIENCES | 3- 14 | 5 1/4 | +1 5/8 | +44.8 |
| O | BRANDON APPLIED SYS | 1- 10 | 1 | + 5/8 | +166.6 |
| O | COMPUTER AGE INDUS. | 1- 3 | 1 | - 1/4 | -20.0 |
| O | COMPUTER ENVIRON | 1- 15 | 1/2 | - 1/4 | -33.3 |
| O | COMPUTER INDUS. | 2- 24 | 4 1/2 | + 1/2 | +12.5 |
| O | COMPUTER NETWORK | 2- 14 | 3 | + 1/4 | +9.0 |
| O | COMPUTER PROPERTY | 4- 15 | 5 1/2 | +1 | +22.2 |
| N | COMPUTER SCIENCES | 6- 34 | 9 1/4 | - 1/4 | -2.6 |
| O | COMPUTER TASK GROUP | 1- 4 | 1 | 0 | 0.0 |
| O | COMPUTER USAGE | 2- 8 | 5 1/4 | + 1/4 | +5.0 |
| A | COMPUTING & SOFTWARE | 16- 75 | 29 1/2 | - 1/4 | -0.8 |
| O | COMRESS | 1- 10 | 2 | + 5/8 | +45.4 |
| O | COMSHARE | 2- 15 | 5 5/8 | - 1/4 | -4.2 |
| O | CONSOL. ANAL. CENT. | 1- 4 | 1 | + 1/2 | +100.0 |
| O | DATA AUTOMATION | 1- 24 | 1 3/4 | + 5/8 | +55.5 |
| O | DATA PACKAGING | 5- 29 | 7 3/8 | +2 1/8 | +40.4 |
| O | DATAMATION SERVICE | 1- 6 | 1 3/4 | + 7/8 | +100.0 |
| O | DATATAB | 4- 9 | 5 1/2 | +1 5/8 | +41.9 |
| O | DIGITEK | 1- 5 | 1 1/4 | + 1/4 | +25.0 |
| O | EDP RESOURCES | 5- 13 | 7 1/2 | 0 | 0.0 |
| A | ELECT COMP PROG | 3- 11 | 3 1/2 | + 1/8 | +3.7 |
| O | ELECTRONIC DATA SYS. | 31-161 | 65 | +6 1/4 | +10.6 |
| O | INFORMATICS | 4- 21 | 8 1/4 | + 7/8 | +11.8 |
| A | ITEL | 6- 26 | 15 | - 7/8 | -5.5 |
| O | LEVIN-TOWNSEND SERV. | 1- 13 | 2 3/4 | + 1/2 | +22.2 |
| A | MANAGEMENT DATA | 7- 25 | 8 1/2 | +1 1/2 | +21.4 |
| O | NAT COMP ANALYSTS | 1- 8 | 1 1/2 | - 1/2 | -25.0 |
| O | NAT.COMP. SERV. | 2- 12 | 3 | + 1/2 | +20.0 |
| N | PLANNING RESEARCH | 13- 54 | 16 7/8 | - 3/4 | -4.2 |
| O | PROGRAMMING METHODS | 9- 27 | 17 1/2 | +2 1/2 | +16.6 |
| O | PROGRAMMING & SYS | 2- 5 | 2 1/8 | + 1/8 | +6.2 |
| L | PROGRAMMING SCIENCES | 1- 33 | 7/8 | + 1/8 | +16.6 |
| N | SCIENTIFIC RESOURCES | 2- 22 | 3 3/4 | + 3/8 | +11.1 |
| O | SOFTWARE SYSTEMS | 1- 3 | 1/8 | 0 | 0.0 |
| O | TBS COMPUTER CENTERS | 4- 27 | 7 | +2 3/4 | +64.7 |
| O | UNITED DATA CENTER | 1- 4 | 2 1/4 | + 1/4 | +12.5 |
| N | UNIVERSITY COMPUTING | 14- 99 | 20 7/8 | - 5/8 | -2.9 |
| A | URS SYSTEMS | 5- 21 | 7 1/2 | +1 1/4 | +20.0 |
| O | U.S. TIME SHARING | 1- 14 | 1 1/2 | - 1/4 | -14.2 |
| | **PERIPHERALS & SUBSYSTEMS** | | | | |
| N | ADDRESSOGRAPH-MULT | 20- 62 | 25 3/8 | 0 | 0.0 |
| O | ALPHANUMERIC | 2- 15 | 3 1/4 | + 1/4 | +8.3 |
| N | AMPEX CORP | 13- 48 | 18 1/4 | 0 | 0.0 |
| O | ASTRODATA | 1- 34 | 3/8 | 0 | 0.0 |
| O | ATLANTIC TECHNOLOGY | 2- 14 | 3 3/4 | 0 | 0.0 |
| A | BOLT,BERANEK & NEW | 3- 11 | 6 3/8 | +1 | +18.6 |
| N | BUNKER-RAMO | 6- 14 | 10 1/4 | 0 | 0.0 |
| A | CALCOMP | 11- 36 | 25 1/8 | -1 1/2 | -5.6 |
| O | COGNITRONICS | 3- 13 | 6 1/4 | - 1/2 | -7.4 |
| O | COLORADO INSTRUMENTS | 5- 12 | 5 1/8 | + 1/8 | +2.5 |
| O | COMPUTER COMMUN. | 5- 36 | 6 1/4 | + 3/4 | +13.6 |
| A | COMPUTER EQUIPMENT | 4- 12 | 4 5/8 | + 7/8 | +23.3 |
| A | COMPUTEST | 12- 28 | 14 3/4 | +1 5/8 | +12.3 |
| O | CONSOL COMPUTER LTD. | 4- 14 | 9 1/4 | +1 3/4 | +23.3 |
| A | DATA PRODUCTS CORP | 5- 26 | 6 1/8 | - 1/4 | -3.9 |
| O | DATA TECHNOLOGY | 2- 23 | 3 3/4 | +1 1/4 | +50.0 |
| O | DIGITRONICS | 3- 13 | 3 5/8 | + 1/4 | +7.4 |
| N | ELECTRONIC M & M | 7- 40 | 8 3/8 | + 1/2 | +6.3 |
| O | FABRI-TEK | 2- 8 | 2 1/4 | + 1/4 | +12.5 |
| O | FARRINGTON MFG | 1- 17 | 1 3/4 | + 3/4 | +75.0 |
| O | INFORMATION DISPLAYS | 4- 20 | 6 1/4 | + 5/8 | +11.1 |
| O | MANAGEMENT ASSIST | 1- 4 | 7/8 | 0 | 0.0 |
| A | MARSHALL INDUSTRIES | 14- 67 | 18 7/8 | -2 1/4 | -10.6 |
| A | MILGO ELECTRONICS | 15- 42 | 21 3/8 | -3 1/8 | -12.7 |
| N | MOHAWK DATA SCI | 19- 87 | 24 1/8 | -1 3/4 | -6.7 |
| O | OPTICAL SCANNING | 11- 52 | 13 | + 1/2 | +4.0 |
| O | PHOTON | 4- 17 | 7 3/4 | + 3/4 | +10.7 |
| O | PHOTO-MAGNETIC SYS. | 1- 9 | 3/4 | - 1/2 | -40.0 |
| A | POTTER INSTRUMENT | 15- 42 | 18 | 0 | 0.0 |
| O | PRECISION INST. | 6- 25 | 7 | + 1/2 | +7.6 |
| O | RECOGNITION EQUIP | 12- 83 | 16 1/8 | +2 1/8 | +15.1 |
| O | REDCOR CORP. | 4- 34 | 6 1/4 | + 1/8 | +2.0 |
| N | SANDERS ASSOCIATES | 7- 29 | 14 1/8 | +2 1/2 | +21.5 |
| O | SCAN DATA | 5- 53 | 8 3/4 | +1 5/8 | +22.8 |
| O | TALLY CORP. | 10- 23 | 11 | - 3/4 | -6.3 |
| N | TELEX | 10- 25 | 15 1/2 | -1 3/8 | -8.1 |
| O | VIATRON | 1- 51 | 1 1/4 | + 3/8 | +42.8 |
| | **SUPPLIES & ACCESSORIES** | | | | |
| N | ADAMS-MILLIS CORP | 8- 15 | 15 | +2 5/8 | +21.2 |
| O | BALTIMORE BUS FORMS | 6- 21 | 6 1/4 | - 1/4 | -3.8 |
| A | BARRY WRIGHT | 6- 25 | 8 1/2 | - 1/8 | -1.4 |
| A | DATA DOCUMENTS | 15- 35 | 19 1/4 | +1 1/4 | +6.9 |
| N | ENNIS BUS. FORMS | 9- 19 | 11 7/8 | +1 5/8 | +15.8 |
| O | GRAHAM MAGNETICS | 4- 11 | 10 1/8 | + 5/8 | +6.5 |
| O | GRAPHIC CONTROLS | 5- 17 | 6 3/4 | +1 1/4 | +22.7 |
| N | MEMOREX | 46-166 | 56 5/8 | -5 1/8 | -8.2 |
| N | 3M COMPANY | 71-114 | 97 1/4 | +1 3/4 | +1.8 |
| O | MOORE BUS. FORMS | 25- 39 | 37 1/4 | + 1/2 | +1.3 |
| N | NASHUA CORP | 21- 43 | 28 5/8 | +1 3/8 | +5.0 |
| O | REYNOLDS & REYNOLD | 25- 48 | 37 | -1 1/4 | -3.2 |
| O | STANDARD REGISTER | 17- 30 | 21 | +4 | +23.5 |
| N | UARCO | 22- 39 | 26 3/4 | +2 1/4 | +9.1 |
| A | WABASH MAGNETICS | 7- 30 | 8 | + 3/4 | +10.3 |
| O | WALLACE BUS FORMS | 17- 41 | 17 3/4 | +1 | +5.9 |
| | **COMPUTER SYSTEMS** | | | | |
| N | BURROUGHS CORP | 78-173 | 110 1/2 | +1 3/4 | +1.6 |
| N | COLLINS RADIO | 9- 37 | 14 1/2 | + 7/8 | +6.4 |
| N | CONTROL DATA CORP | 30-122 | 50 1/4 | - 1/4 | -0.4 |
| O | DATA GENERAL CORP | 16- 59 | 20 3/8 | 0 | 0.0 |
| N | DIGITAL EQUIPMENT | 50-124 | 53 1/4 | -9 5/8 | -15.3 |
| N | ELECTRONIC ASSOC. | 3- 11 | 5 3/4 | + 3/8 | +6.9 |
| A | ELECTRONIC ENGINEER. | 3- 14 | 5 1/4 | - 3/8 | -6.6 |
| N | FOXBORO | 18- 39 | 27 3/4 | +3 1/2 | +14.4 |
| O | GENERAL AUTOMATION | 9- 42 | 11 3/4 | + 1/4 | +2.1 |
| N | GENERAL ELECTRIC | 60- 94 | 93 7/8 | +3 1/8 | +3.4 |
| N | HEWLETT-PACKARD CO | 19- 45 | 30 1/2 | +1 1/2 | +5.1 |
| N | HONEYWELL INC | 65-152 | 83 1/2 | +1 1/2 | +1.8 |
| N | IBM | 223-387 | 316 1/4 | +1 1/4 | +0.3 |
| N | NCR | 30- 86 | 40 1/4 | +2 3/8 | +6.2 |
| N | RCA | 18- 34 | 26 7/8 | + 1/8 | +0.4 |
| N | RAYTHEON CO | 16- 33 | 28 5/8 | +2 1/4 | +8.5 |
| O | SCI. CONTROL CORP. | 1- 8 | 1 1/4 | + 1/8 | +11.1 |
| N | SPERRY RAND | 19- 40 | 27 3/8 | +2 3/4 | +11.1 |
| A | SYSTEMS ENG. LABS | 10- 49 | 14 1/2 | -1 3/4 | -10.7 |
| N | VARIAN ASSOCIATES | 9- 29 | 13 1/2 | + 1/4 | +1.8 |
| N | WANG LABS. | 18- 51 | 30 | + 1/8 | +0.4 |
| N | XEROX CORP | 66-115 | 87 5/8 | +1 3/4 | +2.0 |
| | **LEASING COMPANIES** | | | | |
| O | BOOTHE COMPUTER | 8- 25 | 13 1/2 | + 3/4 | +5.8 |
| O | BRESNAHAN COMP. | 2- 9 | 2 3/8 | + 1/8 | +5.5 |
| O | COMPUTER EXCHANGE | 2- 8 | 3 3/4 | - 1/4 | -6.2 |
| A | COMPUTER INVSTRS GRP | 4- 12 | 8 1/2 | +1 1/2 | +21.4 |
| N | DATA PROC. F & G | 6- 32 | 12 1/4 | +1 | +8.8 |
| O | DATRONIC RENTAL | 2- 8 | 2 | 0 | 0.0 |
| A | DEARBORN COMPUTER | 10- 25 | 24 3/8 | + 7/8 | +3.7 |
| O | DIEBOLD COMP. LEAS. | 2- 8 | 5 5/8 | + 5/8 | +12.5 |
| A | DPA, INC. | 3- 10 | 4 7/8 | +1 | +25.8 |
| A | GRANITE MGT | 7- 22 | 8 3/4 | + 5/8 | +7.6 |
| A | GREYHOUND COMPUTER | 5- 44 | 7 5/8 | +1 3/8 | +22.0 |
| N | LEASCO DATA PROC. | 7- 30 | 17 | +1 3/4 | +11.4 |
| O | LECTRO MGT INC | 1- 9 | 2 | + 1/4 | +14.2 |
| A | LEVIN-TOWNSEND CMP | 3- 19 | 5 3/8 | + 3/8 | +7.5 |
| O | LMC DATA, INC. | 1- 4 | 1/2 | - 1/8 | -20.0 |
| O | NCC INDUSTRIES | 3- 8 | 3 3/8 | + 3/8 | +12.5 |
| O | SYSTEMS CAPITAL | 1- 8 | 3 3/8 | + 7/8 | +35.0 |
| N | U.S. LEASING | 3- 19 | 16 1/4 | +2 5/8 | +19.2 |

*Change from close,Dec.24,1970

EXCH: N=NEW YORK EXCHANGE; A=AMERICAN EXCHANGE
L=NATIONAL EXCHANGE; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

## Computer Stocks Trading Index




BASE FOR EACH TRADING INDEX: 100 as of 3/1/68

# Earnings Reports

**ANALOG DEVICES INC.**
Year Ended Oct. 31

| | 1970 | 1969 |
|---|---|---|
| Shr Ernd | $.18 | $.50 |
| Revenue | 10,431,000 | 8,765,000 |
| Earnings | 223,000 | 616,000 |
| 3 Mo Shr | .05 | .19 |
| Revenue | 2,498,000 | 2,830,000 |
| Earnings | 62,000 | 240,000 |

**BANISTER CONTINENTAL CORP.**
Six Months Ended Sept. 30

| | 1970 | 1969 |
|---|---|---|
| Shr Ernd | $.06 | $.28 |
| Revenue | 10,100,000 | 14,700,000 |
| Earnings | 166,000 | 652,000 |
| 3 Mo Shr | .12 | .14 |
| Revenue | 7,400,000 | 7,300,000 |
| Earnings | 306,000 | 339,000 |

**COMPUTER DATA PROCESSORS LTD.**
Year Ended June 30

| | 1970 | 1969 |
|---|---|---|
| Revenue | $1,266,558 | $1,561,599 |
| Earnings (Loss) | (378,125) | 157,997 |

**IMAGE SYSTEMS INC.**
Nine Months Ended Sept. 27

| | 1970 | a1969 |
|---|---|---|
| Revenue | $3,107,000 | ..... |
| Loss | 2,910,500 | ..... |

a-Comparable figures not available.

**DATA TECHNOLOGY CORP.**
Six Months Ended Oct. 31

| | 1970 | 1969 |
|---|---|---|
| Shr Ernd | ..... | $.03 |
| Revenue | $7,114,000 | 7,671,468 |
| Earnings (Loss) | (945,000) | 41,000 |

**COMPUGRAPHIC CORP.**
Year Ended Sept. 30

| | 1970 | a1969 |
|---|---|---|
| bShr Ernd | $.47 | $.18 |
| Revenue | 16,250,795 | 8,067,008 |
| Earnings | 602,127 | 187,529 |

a-Restated.

**MEMOREX CORP.**
Nine Months Ended Sept. 30

| | a1970 | b1969 |
|---|---|---|
| Shr Ernd | $.97 | ..... |
| Revenue | 65,247,000 | |
| Earnings | 3,613,000 | |

a-Restated by company. b-Comparative figures not reported because of the changing nature of the company's business.

**NATIONAL DATA COMMUNICATIONS**
Nine Months Ended July 31

| | 1970 | 1969 |
|---|---|---|
| Shr Ernd (Loss) | ($1.62) | ($.40) |
| Revenue | 3,774,227 | 2,958,923 |
| Earnings (Loss) | (2,871,480) | (37,072) |

**MANAGEMENT ASSISTANCE INC.**
Year Ended Sept. 30

| | 1970 | 1969 |
|---|---|---|
| Revenue | $64,040,000 | $71,505,000 |
| Spec Cred | a2,160,000 | ..... |
| bLoss | 36,246,000 | 9,824,000 |

a-Settlement of litigation with Potter Instrument Co. b-Includes provision of $32.4 million and $8 million respectively, pertaining to leasing operations, including in fiscal 1970 an evaluation of MAI products line.

**MANAGEMENT DATA CORP.**
Three Months Ended August 31

| | a1970 | 1969 |
|---|---|---|
| Shr Ernd | $.06 | $.21 |
| Revenue | 2,583,466 | 2,130,866 |
| Earnings | 70,731 | 206,866 |
| 6 Mo Shr | .26 | .37 |
| Revenue | 5,032,980 | 3,972,018 |
| Earnings | 273,952 | 369,586 |

a-Restated by company to reflect accounting change. Earnings reported previously were 9 cents a share for the second quarter and 30 cents a share for the six month period.

**COMRESS**
Nine Months Ended Sept. 30

| | 1970 | 1969 |
|---|---|---|
| Revenue | $3,594,000 | $3,661,000 |
| Earnings (Loss) | (246,000) | 392,000 |

**BRESNAHAN COMPUTER CORP.**
Year Ended Sept. 30

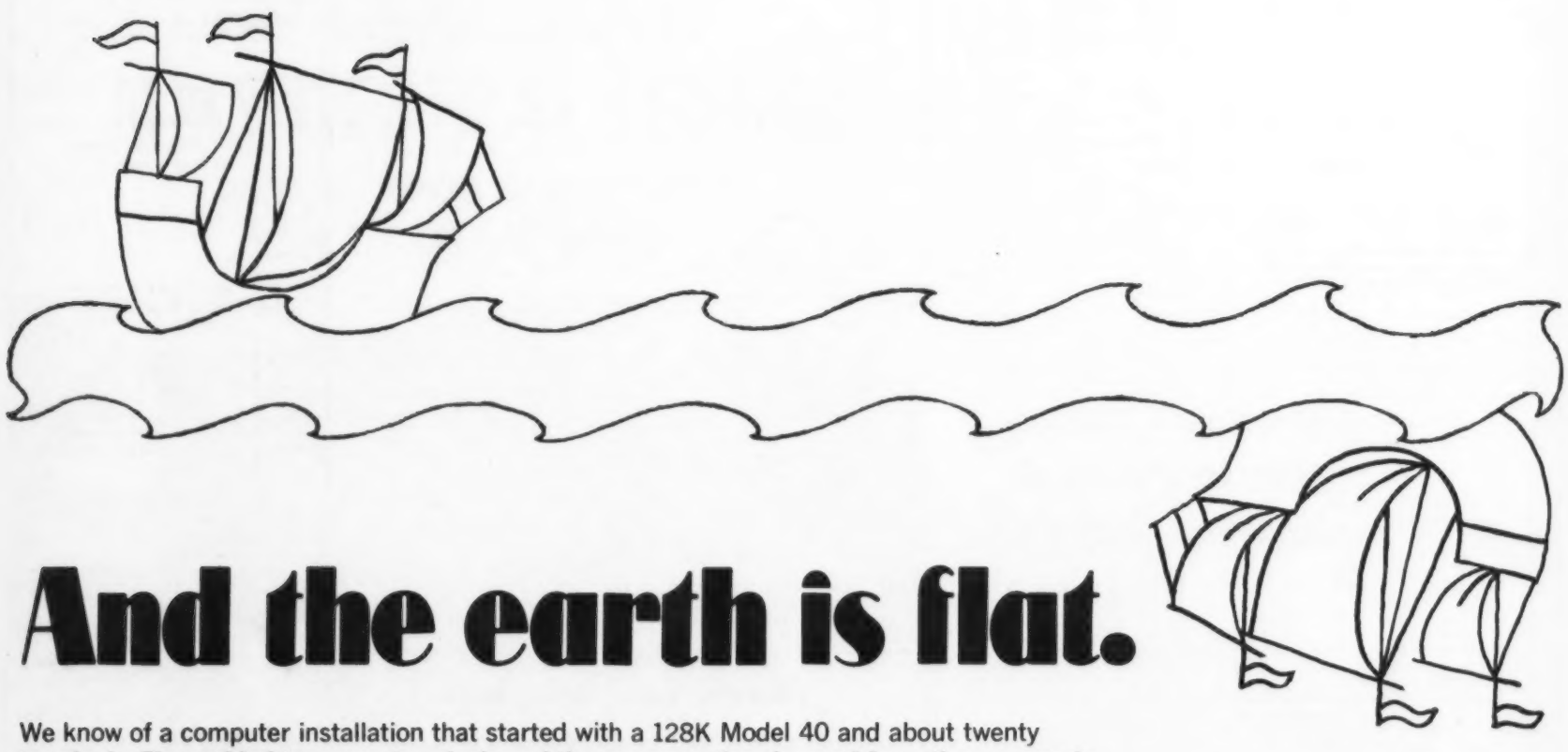
| | 1970 | 1969 |
|---|---|---|
| Shr Ernd | $.20 | $.28 |
| Revenue | 6,035,000 | 3,209,000 |
| Earnings | 388,000 | 408,000 |

**ELTRA CORP.**
Year Ended Sept. 30

| | 1970 | a1969 |
|---|---|---|
| Shr Ernd | $2.70 | $2.84 |
| Revenue | 454,372,656 | 431,942,812 |
| Earnings | 20,890,245 | 22,287,365 |

a-Restated to reflect applicable charge from patent litigation settlement.

# When a terminal-oriented 360 takes 30 seconds to answer your question, the solution is a bigger computer.



# And the earth is flat.

We know of a computer installation that started with a 128K Model 40 and about twenty terminals. They added ten more terminals and the response time jumped from three seconds to thirty. It took 128K more core at $3800 a month to get response time back to normal.

But then they added ten more terminals and went right back to thirty-second response time.

Spending another $3300 a month for a Model 50 didn't help either. They had to add *still* more core to restore response time—but after adding another ten terminals, they were back in the soup again.

There's a solution to this paradox but it doesn't come from IBM. It's called ENVIRON/1—a real-time system that makes a/360 respond in a few seconds *regardless of the model or the number of terminals.*

If you'd like to get your terminal system out of the dark ages and see the response time you were promised, contact us.

ISS **Information Storage Systems, Inc.**

SOFTWARE PRODUCTS □ 10435 North Tantau Avenue □ Cupertino, Ca. 95014 □ (408) 257-6220